M.R.O. 1—77,006—8-6-37.

(1) Number of pages 124

(2) Date of repair 21. 1. 44

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

K.M.S

Government of Madras.

Public works DEPARTMENT.

G.O. No. 3854 Press ~~Mis.~~

123-24

Dated 8. 12 1869.

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department, 8th December 1869.

Read the following :—

No. 123. From the Acting Superintending Engineer, 4th Division, to the Acting Chief Engineer for Irrigation, dated Madras, 14th September 1869, No. 3,096.

WITH reference to G. O., No. 2,643, dated 11th August 1869, paragraph 8, and to your Memoranda Nos. 168 and 184, dated 1st April and 23rd April 1869, I have the honour to submit a Report from Captain Hasted, R.E., Executive Engineer, in charge of the Polur range, North Arcot district, on the project which has lately been investigated of throwing an anicut across the upper branch of the Cheyaur river near Mambakum, for the irrigation of lands in the Polur talook of the North Arcot district, and on the supply of water now available in the Cheyaur river for the irrigation from the tanks dependent on the existing anicut across this river near Arnee at the village of Amivithy.

2. This Report is accompanied by a survey of the country proposed to be irrigated, showing the site of the anicut, the alignment of the channels on both banks, and the situation of the tanks to be fed, also by a line of sections of the channels; all the plans and surveys having been prepared by a Surveyor under Mr. Assistant Engineer Bevan's orders. An ayacut statement showing the present cultivation and expected increase from the project, and two registers giving the quantity of water passing over the Cheyaur anicut and through the head-sluice for a series of years, are also enclosed.

3. The investigation of the amount of water obtainable from the Cheyaur anicut channels is intimately associated with that of the project now under review, because, unless the tanks supplied from this anicut receive their full supply of water for irrigation, and sufficient water is stored in them, and also taken off direct from the channel for the increased cultivation, which it is hoped will be obtained on the extension of the project, it is unprofitable to make enquiries regarding the further storage of water from the river for other projects. It becomes necessary, therefore, to ascertain what amount of water the Cheyaur anicut now diverts, and what quantity of cubic yards are running to waste when freshes pass over this work.

4. As regards the question of the sufficiency of the Cheyaur anicut supply, Captain Hasted reports that he has had considerable difficulty in obtaining a correct register of the water passing down the river and channels daily, monthly, and yearly. These registers have been imperfectly recorded, and the gauges put up to ascertain the depths have not been properly fixed. He encloses a diagram showing the heights of water at the anicut from 1863 to 1868, and he gives approximately the total discharge in cubic yards over the work from 1865 to 1868, the crest having been raised from five to seven feet in the former year. He also furnishes the discharge approximately through the head-sluice for the same years, the quantity in 1866 being assumed not having been properly registered.

5. The year 1866 was an exceptional year, and the floods were from five to fifteen times greater in volume than in ordinary years. Such a similar flood had not occurred since 1854, and it is safer to leave such years out of our calculations.

6. In estimating the quantity of water passing through the sluice, no register of the depth below the vents has been kept. The fall of the channel is inappreciable

for two miles, and Captain Hasted was obliged to assume a certain figure for loss of head at the work.

7. It is shown from the registers kept that the freshes passed over the anicut in July and November of 1859, but for what number of days is not known; none at all in 1860; nineteen days in 1861, when the anicut was five feet high; seven days in 1862, with the same height of anicut; seven days, or one day, in 1863, according to which height of anicut is taken; twenty-five days, or three days, in 1864; seven days in 1865, the year in which the anicut was raised; three days in 1867; and two days in 1868. In the three years under review the quantity of water passing down the river and channels is given below:—

Year.	Anicut.	Channel.	Total Cubic Yards.
1865	32,420,914	59,344,012	91,764,926
1867	8,492,726	37,810,440	46,303,170
1868	7,961,766	22,622,238	31,584,004

8. The years 1867 and 1868 were unfavourable, the monsoons having failed; but Captain Hasted states the year 1865 may be taken as an average one, the extent of the freshes fully representing what ordinarily may be calculated upon for irrigation purposes. It will be seen that the sluice passed down fifty-nine millions of yards, and the anicut was submerged for seven days, thirty-two and a half millions of yards nearly having passed over it.

9. I have studied the diagram of water at the anicut carefully, in order to make still further a comparison of the year 1865 with others, and though the actual discharge in 1863 and 1864 has not been computed, I have obtained an approximate estimate of the quantity of water passing down by taking the heights of the water at the anicut each day in the year. I find that in 1863 there was water for eighty-nine days, or three months, in the river to a total depth on the anicut of 23[illegible] feet; in 1864 for 143 days, or five months, to a depth of 344 feet; and in 1865 for 122 days, or four months, to a depth of 228 feet. The quantity of water therefore in 1863 and 1865 corresponded, whilst in 1864 it was probably half as much more as in these years. The freshes, however, in 1865 were rather more seasonable for cultivation than in 1863 and 1864.

10. The amount of cultivation under the main channel is 4,834 acres, the Tetry branch, which we are now excavating, supplies 2,063 acres, and 1,500 acres more are expected to be brought under cultivation when the extension is completed, making a total of 8,397 acres. Captain Hasted reports that the surplus of Poorsay Tank near the end of the main channel gives a supply to thirty tanks, the aggregate ayacut of which is 3,361 acres; but this irrigation is most uncertain, the land being now dependent on the rain-fall. The Executive Engineer assumes the quantity of water required for one acre as 10,000 cubic yards; I will take it as 7,000, in order to place the project in the most favourable light. The 8,397 acres will require therefore fifty-eight millions of cubic yards of water, about equivalent to the quantity passed through the sluice in 1865; whilst, if the additional acreage referred to above is taken into consideration, eight-ninths of the supply passing down the Cheyaur river that year would be required.

11. Assuming that thirty millions of yards, which is the amount in excess passing over the anicut, are available for cultivation from an upper anicut project, this quantity will irrigate an extent of 4,000 acres; and taking the revenue as Rupees 3-12-0 per acre on the average, as given in Captain Hasted's Report, the return would be Rupees 15,000, exclusive of deduction for maintenance and establishment. The estimate framed by Mr. Bevan amounted to Rupees 4,54,000, which was prepared for the system of channels as shown in the accompanying survey, so that the profit would amount to three per cent.

12. It is true that the extent of rain-fall ought to be taken into consideration, and that in a good year the tanks which might otherwise be supplied from the river freshes are half or three-quarters filled by the local rains; but the returns here given show the actual quantity of water passing through the sluices as near as we are able to approximate to it.

13. The ayacut statements, as prepared by the Collectors of North and South Arcot, and which are tabulated in the enclosed return, with the exception of the Tindevanum talook, which I have included at the foot, show that the quantity of land capable of irrigation, were the tanks provided with a full supply, is in excess of the above, and amounts to 3,329 acres of nunjah, 2,306 acres of punjah, and 2,128 acres of waste land convertible into nunjah.

14. The profits likely to be derived from the original project having been shown to be unremunerative, Captain Hasted has roughly estimated the cost of building the anicut and excavating the channels on a reduced scale, extending them only so far as to enable them to supply two of the largest reservoirs on each bank of the river. He then estimates the returns likely to accrue, and the per-centage of profit on the outlay. The original work contemplated channels twenty-eight and twenty-seven miles long north and south, feeding forty and seventy-five tanks on each bank of the river; the Executive Engineer reduces the lengths to twelve and thirteen miles, terminating in the Polur and Soracolatoor tanks. He also adopts a capacity of channel fifty feet wide at sole, side slopes one and a half to one, fall of bed two feet per mile, capable of carrying off, the two together, as I also found by calculation, twelve millions of cubic yards in twenty-four hours; the quantity which was brought down in one day in 1865 amounting to nearly one-half the whole supply* of that year over the anicut. The cost of such a modified project he estimates at three lacs; and the return from 3,000 acres of wet cultivation, at Rupees 3-12-0 per acre, deducting 600 rupees per annum for establishment, at Rupees 10,650, barely $3\frac{1}{2}$ per cent. on the cost. Taking the *data* I have assumed for the irrigation of an acre of land, the area would amount to 4,000 acres; yielding under five per cent. as a return for the expenditure. I must further observe, however, that I do not see from the ayacut statement that the lesser extent of land, even, mentioned above, is available for increased cultivation from this supply. The original project, without any modification, contemplates the irrigation of about 7,700 acres only, nunjah, punjah, and waste land, all included.

* Cubic yards 32,420,914.

15. Captain Hasted refers to the subject of forming capacious reservoirs in the hills, to be fed from the sources of the Seeyaur and Cheyaur rivers, which was

one of the matters for investigation brought to his notice when he was appointed to the duty of investigating this project. His occupations as Range Officer have precluded his carrying on this investigation, excepting to a very partial extent; but he believes that a gorge of the hills west of Vellore, through which one of the principal tributaries of the Cheyaur flows, and which he has hastily explored, offered a favourable site for such a reservoir.

16. Though I have shown in para. 11 that the available water is not sufficient to cultivate a sufficient extent of land to make the project barely remunerative on the basis of Mr. Bevan's estimate, I will assume that the whole land could have been irrigated as entered in the Collector's statements of ayacut, and then see what the gain on the capital laid out would be.

17. Mr. Reade, the Collector of South Arcot, reports that the increased return to Government, if the anicut were built, would be Rupees 13,690 in his district. Taking the total amount of land to be cultivated under every head to be 7,763 acres, of which 5,088 are in the North Arcot district, and allowing Captain Hasted's *data* for the increased average revenue on each acre, the return would be Rupees 19,080. Thus the whole increased revenue would be Rupees 32,770 on an outlay, which the Executive Engineer considers under-estimated, of Rupees 4,54,000, or 7·2 per cent.

18. From these remarks on the project, it will be seen that the scheme of irrigation from an upper anicut on the Cheyaur does not present itself very favourably to view. The existing Cheyaur anicut irrigation is now being extended, and it is known, that if the tanks which are fed from these channels receive their full supply, which the local rains have scarcely ever as yet been able to afford, there is quite sufficient land to take up all the water which can be drawn off by the head-sluice. If another work were constructed higher up the river, there is every probability of the water being diverted from the present anicut, and the cultivators under it unjustly deprived of their fair supply. In such a rapid river also, where the floods are of short duration, it would be very difficult to establish such regulations for the working of the sluices as would allow of the surplus water only passing over the lower anicut, being made available for the upper one.

19. I think it is to be regretted that the registers of the floods in these rivers are so imperfect as to prevent our obtaining more reliable returns, or, at any rate, returns embracing a longer series of years. Though the river was flowing for a greater number of days in 1864 than in 1865, the floods which passed over the anicut only lasted three days. In 1863 the anicut was only over-topped for one day, and I think sufficient has been deduced to show that the floods are of short duration, and the great fall of the bed ensures their rapidity. In 1867 and 1868, which were however very dry years, and when the rains only affected the river in June and August, failing altogether in the monsoon months, the whole of the floods to the extent of eight millions passed over the anicut in two and three days; and in 1865 nearly one-half the whole quantity discharged in the seven days when the anicut was submerged—namely, thirteen millions—flowed down in one day. Such being the character of this river, I think our attention ought to be drawn to the capabilities of the country drained by its agency for forming storage reser-

voirs, as the cost of capacious channels capable of taking off these flood-waters, and which would necessarily be of great length to feed numerous small tanks as this project embraces, would be quite incommensurate with the amount of profit serivable from extended irrigation.

20. I am not aware what circumstances led to the adoption of the site for the present anicut; but I believe if the work had been built below the confluence of the Cheyaur and Seeaur rivers, it would have commanded an equal number of large tanks, whilst the water of both branches would have been made available. You have been informed, however, that a project for cultivating lands, both in the North Arcot and Madras districts, from an anicut across the main river near Taudry, about ten miles below the existing work, has been in course of investigation for the last year. A large number of tanks have been contoured; a series of levels, embracing very many miles in length, and extending to the junction of the Palar and Cheyaur rivers, have been made; and the survey has been completed and partly plotted. As this project will embrace the storage of water from a larger extent of drainage, and the utilization of the flood-waters of the Calway mudagoo, a stream flowing into the Cheyaur, which is fed indirectly from the Palar river, as well as the supply of two or three very large and fine tanks, such as the Doosy Mamandoor and Ootramalloor, I believe it will be found more worthy of our attention, than a scheme to divert the surplus water of the Seeaur river alone. In a few months Mr. Leggatt, the Executive Engineer at Chingleput, will have had the plans drawn out and an estimate made, which will enable us to form a judgment as to the remunerative character of the project, though the registers of the northern branch of the river, or the Seeaur, have yet to be recorded.

REPORT ON THE MAMBAUKUM PROJECT, CHEYAUR RIVER.

Description of River.

THE Cheyaur is the drainage stream of the southern part of the Javadie hills in the North Arcot district. It at first receives its supply from the west side of the hills, running nearly north and south, then, sweeping round the southern extremity of the hills, it leaves them and runs in an easterly direction to its junction with the Palar near Wallajahbad, in the Madras district. The bed of the river in the plains is from 300 to 500 feet in width, and its fall from seven to twelve feet a mile. The bed is generally sandy, but masses of rock are to be met with in places; its drainage area is about 500 square miles.

2. After leaving the hills the first considerable addition the main stream receives is from the Mirugunda Nuddi, which joins the river near the village of Chodaveram; this stream has a dam across it about a mile above its junction, and most of its supply is diverted to tanks. Some miles below this point part of the drainage from the Curnatighur near Palar joins the river, and other smaller drainages, the principal of which is the Numbadoo mudagoo from the South Arcot district. About seven or eight miles to the east of Arnee, the Cheyaur is joined by the Seeaur, a river nearly as large as itself, which drains a more northern part of the Javadie hills. This river has six dams across it, three of which are in ruins.

3. Many channels are led from the river, some with head-sluices, but the greater part with open heads to supply tanks. Below these heads, when the river is low, the villagers are in the habit of running out corumboos to turn the water into the channels.

Cheyaur Anicut.

4. The only anicut in existence on the Cheyaur is the Cheyaur anicut, near a village called Amurthay, about nine miles from Arnee. One channel only is taken off above the anicut on the south bank, called the Cheyaur main channel. The anicut was built in 1852 and raised five feet above the bed of the river, the head-sluice had four vents of five feet wide, and the channel was eight yards wide. In the beginning of 1865 the anicut was raised two feet, the head-sluice had three vents added to it, and the channel was widened to twelve yards up to Mookoor tank. The following year the channel was improved and widened up to the twelfth mile. In 1867-68 a further distance of eleven miles of the channel was widened to ten yards. In 1868-69 a branch channel, called the Tetry branch, commencing in the twentieth mile of the main channel, was excavated six yards in width for six miles, and this channel is now being extended. The main channel is about twenty-one and three-quarters of a mile in length. The Tetry branch is eight and one-eighth of a mile long. Another branch, called the Coviloor and Covalavadoo channel, is now being improved.

Cultivation under the Cheyaur Anicut.

5. The extent of land under the main channel is 4,834 acres (including the last named branch). Under the Tetry channel the existing cultivation is 2,063 acres, and the villagers propose to extend the wet cultivation by 1,500 acres, making a total of 3,563 acres under this branch. The total cultivation under the Cheyaur main channel is therefore 8,397 acres, and if the freshes continued sufficiently long, water might be supplied to other tanks.

The surplus of Poorsay tank gives a supply to thirty tanks, the aggregate wet ayacut under which is 3,361 acres.

Supply of water in the river.

6. I have experienced considerable difficulty in calculating the discharge both of the river and the Cheyaur main channel, owing to the very incomplete manner in which the water registers have been kept, and to my not having had an opportunity of seeing the river in fresh. I have supplemented the information, received from the registers, by careful enquiry on the spot, and the results I have obtained by calculation I feel certain err on the safe side; that is to say, the discharges I have given are somewhat in excess of the actual discharges.

Quantity of water passed over the Cheyaur Anicut.

7. Appendix A. shows the amount discharged every day over the Cheyaur anicut during the years 1865 to 1868, that is since the anicut was raised, and the diagram accompanying, which was traced from the registers kept at Cheyaur anicut, shows the level of the water from 1863 to 1868. The registers of years prior to 1863 are so incomplete that I have not attempted to trace the water level; but from the depths measured at the head-sluice in those years, it appears that water passed over the anicut (then five feet in height) for seven days in 1862, the greatest height being two and a half feet above the crown; during nineteen days in 1861, the

greatest height being four feet above the crown for one day; not at all in 1860; and for some time in July and also in November 1859, but for how many days is not stated. I cannot discover that the under-sluices have ever been opened except on occasions when the channel breached, or work going on at the head-sluice prevented its being opened. I have marked on the diagram the occasions in which I find the under-sluices were opened; but no register having been kept while they were open, I do not know what water was passing down the river. In 1864 the channel was breached and the head-sluice was closed, but the under-sluices appear not to have been opened. In 1865 the head-sluice was closed in order that the channel might be cleared. In 1866 the channel breached in July, and the head-sluice was closed till the beginning of December; the under-sluices, I am assured, were not opened during that time (which would account for the great height the water rose), and in the last three years they have never been opened. From a record left by Mr. George, late Assistant Engineer at Arnee, and from longitudinal sections of the river, both at Cheyaur anicut and near Mambaukum, I have deduced the heights due to velocity of approach at the anicut. The full water-way above the anicut is three bays of twenty-six feet span, six bays of twenty-five and three-quarters of a foot, and six bays of fifteen feet over the under-sluices. The large bays have the water-way further contracted by two steps of masonry on each side of each bay on the crown of the anicut; the first step is two feet long and one foot high, the second step one foot long and one foot high. The water-way, therefore, up to one foot above the crown is 286½ feet, between one and two feet 304½ feet, and above two feet 322½ feet. The discharge was calculated for every three inches in height. The total quantity discharged over the anicut is—

in 1865	32,420,914	Cubic yards.
,, 1866	482,687,614	do.
,, 1867	8,492,726	do.
,, 1868	7,961,766	do.

Quantity of water discharged by the Cheyaur main channel.

8. Appendix B. shows the quantity of water discharged by the Cheyaur main channel during each month of the years 1865, 1867, and 1868. There is no record to show when the head-sluices were closed in 1866. The discharges are, I must repeat, only approximations. The only register kept is the depth in front of the head-sluice, and there is some doubt as to whether the depth registered is that above the floor of the sluice or above the silt. The bed of the channel has no fall for two miles from the head-sluice, and after that the fall is two feet a mile up to the Cadooganoor aqueduct. The bed of the first two miles is hard gravel or rock, and the consequence is the channel throws back the slope and silts up the head till the bed assumes a uniform slope. After inquiry as to the depth of water on the floor of Cadooganoor aqueduct, I have allowed the loss of head to vary from two feet to six inches, and with these deductions have calculated the discharges of the channel for every three inches in depth. The discharge is—

in 1865	59,344,012	Cubic yards.
,, 1867	37,810,440	do.
,, 1868	22,622,238	do.

and therefore the total discharge of the river was—

in 1865	91,764,926	Cubic yards.
,, 1866 say	500,000,000	do.
,, 1867 ,, ...	46,303,170	do.
,, 1868 ,, ...	30,584,004	do.

when the head-sluice was closed, I took the average discharge of other years during that month, as the amount discharged, and added it to the discharge of the channel.

Objections to the proposed anicut.

9. From these figures I do not hesitate to say that it is unadvisable to build any anicut above the Cheyaur. The year 1866 was an extraordinary year. No water came down the river during the early part of the year, but while the tanks all over the country were receiving a good supply from rain, heavy floods passed down the river five times as much as in the year before, one-tenth of which water could not have been caught even if two anicuts had been in existence, because there was no storage room. The only other year in which floods of this kind are known to have occurred was 1854, so that I leave the year 1866 out of my calculations, for cultivation cannot be extended and the capacity of tanks increased because once in ten years, say, a large supply of water is available from the river.

10. The years 1867 and 1868 were unusually dry years, and the supply of water in the river was so small that no water was supplied to tanks below Mookoor tank (ten miles from the anicut) by the Cheyaur main channel.

11. The year 1865 is allowed to have been a good year, and the cultivation under the Cheyaur channel was more extensive than in any of the last five years. It was a good year not only because plenty of water came down the river, but because there was an early long-continued fresh just at the time ploughing ought to commence, and a good late fresh which left water in the tanks to supply the crops which remained after the monsoon rains were over. The total discharge of the river then in a good year is under ninety-two millions of cubic yards, and the cultivation under the Cheyaur main channel and branches is 8,397 acres, besides a further extent of land to which water may eventually be supplied. Should local rains fail, the whole supply of the river would be required for the Cheyaur main channel, and for the Mambaukum channels would remain nothing.

This, however, is not quite a fair conclusion, because it almost invariably happens that when there is a good supply of water in the river, there is rain on the plains, and therefore the full amount allowed to be stored for each acre, viz., 10,000 cubic yards, is not required; and also the fall of the river is so great, and the freshes so sudden, that it is hardly possible to catch all the water in the river even in a dry year.

Available supply for Mambaukum Anicut.

12. The water that cannot be stopped by the Cheyaur anicut would be available for the Mambaukum project, that is to say, all the water in the river would have to be passed through the under-sluices of the Mambaukum anicut until the water rose to such a height as to overtop the Cheyaur anicut, when the Mambaukum channel sluice could be opened to such an extent as would keep the water to

the level of the crown of the Cheyaur anicut. This could be determined only by experiment. Referring to Appendix A., it will be seen that in 1868 nearly eight millions cubic yards passed over the anicut in two days; in 1867, nearly eight and a half millions in three days; in 1865, nearly thirty-two and a half millions in seven days, deducting half a million cubic yards per diem as the amount the Cheyaur main channel improved will carry off.

We have the Mambaukum anicut—

		Cubic yards.
In 1868...	... ...	7 millions in two days.
,, 1867...	... ...	7 do. in three do.
,, 1865...	... ...	30 do. in six do.

Mambaukum Project.

13. Accompanying this report is a copy of the survey and levels taken under Ensign W. G. Bevan for the Mambaukum channels. Appendix C. also shows the ayacut and assessment under tanks proposed to be supplied, the cultivation and revenue for each year from 1862-63 to 1866-67, the extent of land under each tank assessed as nunjah that remained uncultivated in the best of the five years, the extent of punjah that can be converted into nunjah, and the extent of waste land that can be converted into nunjah. The project is to build an anicut across the Cheyaur, five miles above the point at which the river is joined by the Miroogunda Nuddi, with head-sluices on either bank, and to excavate channels on both sides. The northern channel to be twenty-eight miles long, supplying forty tanks, and the southern channel twenty-seven miles long, supplying seventy-five tanks; the northern channel to be carried across the Miroogunda Nuddi by an aqueduct, and both channels to be carried along the highest ground practicable, and generally to supply the tanks from sluices in the channel banks, when this cannot easily be done the channel is carried through the tank and over the surplus calingulah. The width of the river at the site of proposed anicut is 380 feet, and its fall seven and a quarter feet per mile.

14. It will be seen at a glance that it is impossible to carry out the project to the extent originally proposed; cultivation will not be increased unless an increased supply of water can be afforded regularly, and the register of former years afford us no grounds on which to promise a larger yearly supply than we had in 1865. Taking then the available supply in 1865, as given above, as the average yearly supply for the Mambaukum project, it remains to be seen whether any modification of the original scheme can be made, which will give a reasonable return on the expenditure necessary to carry it out.

Modification of project.

15. First, as to the best form of channel. I think, as the soil being generally firm and hard, the channel should be only carried partly within soil, and by this means the expense of cutting, which will be considerable, as rock is frequently met with a short distance below the surface, will be lessened. The side slopes of the channel might be one to one, the side slopes of the embankment one and a half to one, and the greatest slope of bed I should then venture to give would be two to one.* The depth of water the channel would be required to carry would be seven feet. Next, the width of the channels. It will be seen (Appendix

* Two feet to the mile.

A.) that the whole quantity of water comes down in six days, and nearly half of it in one day; under the circumstances stated, two channels, each fifty feet wide at bed, would discharge twelve millions of cubic yards in twenty-four hours, and therefore would convey very nearly all the water available.

16. Mr. Bevan has prepared plans of the anicut and masonry works for the proposed channel and detailed estimates for the principal works, and an estimate of the whole cost of the project was drawn up. He proposed to make the south channel forty-eight feet wide, and the north twenty-four feet. His southern channel would nearly take off half the water.

17. To enable the channels to be of the greatest possible use, I should carry them to some considerable reservoir, so that if more water was even available it can be used. The north channel should terminate in Polur tank, the south channel in Soracolathoor chittary, from whence there is a drainage to supply other tanks. The first would be twelve miles long, the second thirteen miles.

Estimate of cost.

18. I have carefully estimated the cutting necessary for both channels, and have allowed a rate lower than Mr. Bevan provided, but which would suffice if a large quantity of rock is not met with. The estimates of masonry works are based on the estimates already drawn up. The following is an estimate of the modified project:—

	RS.
Dam and head-sluices	30,000
Northern channel, twelve miles long, earthwork ...	1,35,489
Aqueduct, Miroogunda Nuddi	10,000
Five bridges, at Rupees 1,500	7,500
Five supply-sluices, at Rupees 150	750
Four masonry falls, at Rupees 350	1,400
Southern channel, thirteen miles long, earthwork ...	1,02,960
One aqueduct	1,500
Four bridges, at Rupees 1,500	6,000
Four supply-sluices, at Rupees 150	600
Improvement of tanks..	5,000
Total of Estimate Rs.	3,01,199

or say three lacs of rupees.

19. The returns can best be estimated in this way. The discharge of the channels will be thirty millions of cubic yards; allowing 10,000 cubic yards as the amount to be stored to cultivate an acre, it would provide for 3,000 acres. The land revenue has not yet been settled in this district, and the assessment varies very much. It was estimated in the Tetry branch channel that the increase of revenue on each acre watered would be Rupees 3-9-4, and from examination of the assessment given in the statement, Appendix C., it would appear that this is nearly all that can be expected. I will assume it is rather more, say Rupees 3-12-0 per acre. The total increase of revenue on 3,000 acres would then be Rupees 11,250.

Cost of Establishment.

20. From this a deduction must be made for the cost of establishment, which must be large, as with such sudden freshes, delay in working the shutters

would cause serious loss of water. The pay of one Monigar and six Lascars would be 50 rupees a month, 600 rupees a year.

The neti ncrease of revenue would, therefore, be 10,650 rupees from an outlay of rupees three lacs, or under three and a half per cent.

Further modification.

21. A deduction in the width of the channels and their extent would not make the project remunerative, for the quantity of water conveyed by reduced channels decreases in a larger proportion than the cost of the works; a reduction in the length would not pay either, for want of storage room.

Project not to be recommended.

22. There are some cases in which I should recommend a project for execution, even if the expected returns were not a much larger per-centage on the expenditure than here, but in this case I have not taken into account the last two exceptionally dry years; I have based my calculations on an allowed good year, (as may be seen from the statement, Appendix C.), and I have made provision to catch almost every cubic yard of water that passes down the river. Moreover, the modified project does not provide for an increased supply in times of scarcity, but only for an extension of cultivation in good years.

Necessity for fully explaining objections.

23. It has been necessary for me thus fully to explain my reasons for forming a decided opinion against the advisability of carrying out the Mambaukum project, and to look at it in the most favourable light, because the project has been rather a favourite one with more than one Revenue Officer, who, seeing a considerable stream of water rushing through dry and arid plains, would not easily believe but that it must pay to dam the river and fill the numerous tanks which might be seen, perhaps, at the same time, nearly empty. The fact is the rights of the villages under the Cheyaur anicut to the water have not been considered; even the Tahsildars allowed that the water in the river will not suffice for the Mambaukum anicut and the Cheyaur anicut as well, and it is proposed to enrich the one talook at the expense of the other.

Claims of Cheyaur Anicut.

24. The Cheyaur anicut having been in existence for fifteen years, has established a right to the water it can consume; and as this is nearly the whole of the water in the river, an upper anicut scheme must be rejected. It is much to be regretted that, before building the Cheyaur anicut, the whole river had not been examined, and its resources developed from the commencement of its course. If an anicut had been built, in the first instance, somewhere near Mambaukum, one or two smaller dams might have been afterwards constructed below it, and every drop of water in the river, in ordinary years, utilized. As it is at present, unless the average supply of water in the river can be proved to be amply sufficient for both anicuts, the difficulty in apportioning the water would in itself be, in my opinion, a great objection to the present project.

Reservoirs in Hills.

25. In the case of a river, such as the Cheyaur, having a great fall and bringing down occasionally a large body of water, generally at a time when local rains are filling the numerous small reservoirs which are to be found all over this

part of the country, a reservoir on a very large scale, formed by damming up some gorge in the hills, would be a great advantage, enabling us to store the flood-water for use at a time when the river was low. In accordance with my instructions I have examined the eastern face of the Javadie hills, with a view to find a suitable site for such a reservoir. The main channel of the Cheyaur to the north of Chengamah I have not yet been able to explore, as it is at some distance from the range which I have been in charge of, and the difficulty in travelling would cause the journey to occupy more time than I could spare. Probably the officer in charge of South Arcot district has examined the river in this part and could give some information on the subject. I can find no other site for a reservoir on the Cheyaur, or the southern branch of the Seeaur, but on examining the northern branch of the Seeaur, about ten miles from Vellore, I found a gorge in the hills, which I think might be closed and a reservoir of same size found.

Site for Reservoir.

26. It will be seen from the survey map that a little to the west of the Caniambady pass, on the road from Vellore to Arnee, the northern branch of the Seeaur has two branches, which join near the village of Mathalumpuddy. Following the southern of these branches we come to a gorge in the hills, about a mile north of the village Ammurthy. The width of the gorge is about 500 yards, the width of the bed of the river about eighty yards, the ground rising from the bed of the river in steep slopes to the hills. Immediately within the gorge the bed of river widens out to about 300 yards width; the valley is of considerable width, and the ground cut up with gullies and covered with jungle, and I believe a considerable body of water could be stored by a dam of not very great height. The catchment basin is about fifty-four square miles.

Objection to site.

27. I referred above to dams already built across the Seeaur; the river passes for a considerable distance through the Arnee Jaghire, and the Jaghirdar has three dams across it, two of which are in good order, the third breached; one of the dams is near the village of Camakoor, below the junction of the two branches of the Seeaur, and he would consequently be the first to benefit by any reservoir that might be found in the hills.

Rights of Arnee Jaghirdar.

28. Before building the proposed anicut near Tandri, I would suggest that some arrangement be made with the Jaghirdar, as it appears he has the right of building any number of dams across the Seeaur, and might affect the supply of water calculated on below.

Measures taken to carry out instructions.

29. With reference to the other instructions conveyed with your memorandum under reply, I have the honour to report that I have taken levels of the bed of the Seeaur near Arnee and thirteen cross sections, a quarter of a mile apart, and have calculated the discharges for every three inches in depth, and recorded them. I have taken measures to have the discharge gauged near Arnee and estimated.

I have also set up gauges at the Cheyaur anicut channel head-sluice, and made arrangements to have the water register fully kept in future.

Minor improvements to irrigation.

30. As to any improvements to the existing irrigation works that can be carried out, the principal want of the Cheyaur main channel is a fall in the first two miles of its bed. While in charge of the range, I have had the head of the channel thoroughly cleared, and it appears that the bed is for the most part rock, and any cutting would be very expensive. I am about to have levels of the Polur supply channel from the Cheyaur taken, and propose improving it and building a head-sluice to it, with probably a loose stone dam across the river to keep the front of the sluice from silting up. The tank is a fine one, existing ayacut is 946 acres, and in the best of the last seven years, ninety-four acres of this were uncultivated. An estimate for raising the dam across the Miroogunda Nuddi has already been submitted.

State of the District.

31. In conclusion, I wish to remark that the state of this portion of the North Arcot district does not seem to me so bad as it is made out to be. The Polur Tahsildar says he recommends the talook should be given up and left as jungle. The records of past years show that wet cultivation is carried out to a considerable extent, and it is a fact that fresh land for dry cultivation is constantly being taken up. The last two years have been unusually dry, and cultivation is very scanty in consequence. Wet cultivation from wells is going on in places, and from measurements I have taken, I find that water is nearly everywhere to be found from fifteen to twenty feet below the surface of the ground.

I do not believe the rain-fall is less now than formerly, but I think it very probable that the great clearance of jungle near the hills has made the country drier, and in this respect it will continue to get worse. The Padavadoo jungles afford a means of livelihood to hundreds of people, who appear to me to cut indiscriminately, mutilating the trees and wasting the wood; acres and acres of charred stumps may be seen, the ground between being ploughed up and sown, and columns of smoke rising beyond show that the work of destruction is still going on.

The villages thereabouts become healthier in all probability, but the country becomes drier, and as the clearance extends the dryness will increase.

(Signed) J. O. HASTED, Captain, R. E.,
Executive Engineer, Polur Range.

ARNEE,
31st July 1869.

No. 275.

NOTE BY THE ACTING CHIEF ENGINEER FOR IRRIGATION.

On his return from England, in March last, Captain Hasted was deputed to complete the investigation of the project for constructing an anicut across the

Cheyaur, near the village of Mambaukum, the object of the work being the supply of a considerable number of tanks on both sides of the river in the Polur Talook of the North Arcot District. Surveys and levels had already been prepared in connection with this project by Mr. Bevan, and Captain Hasted was furnished with instructions to obtain the additional information required to enable the merits of the scheme to be more clearly understood, in order that the Government might be in a position to decide whether the construction of an upper anicut would be likely to be attended with the beneficial results, which certain Revenue officers had represented would be secured by it. Mr. W. Robinson, in a Memorandum dated 22nd January 1868, para. 6, had specially drawn attention to this work, which he considered to be all-important and absolutely indispensable to the welfare of the Polur Talook; and the Secretary of State in noticing that Report expressed the opinion that if Mr. Robinson's statements were borne out, no time should be lost in commencing a work of such importance to the district, provided the claims of existing irrigation under the river could be duly secured.

P. M. G. Revenue Department, 3rd Feb. 1868, No. 308.
Public Works Department, No. 420, 7th Feb.

P. M. G. Revenue Department, 6th May 1868, No. 1,244.
Public Works Department, No. 1,717, 1st June.

2. Captain Hasted's attention was directed, in the first instance, to the ascertainment of the water-supply of the river. The *data* for estimating the discharge were known to be very far from complete, but he was instructed to supplement them, as far as possible, by local enquiry, and to be careful to explain very fully how the conclusions at which he might arrive had been worked out. Then the requirements of the cultivation under the existing Cheyaur Anicut were to be considered, and the best means of utilizing any surplus, which might be found to be available, were to be reported.

3. This Officer's report contains a short sketch of the circumstances of the river, and of the anicut near the village of Amurthay, which was built in 1852, and under which the channels have for some time past been undergoing extension. It is shown that the extent of land under the—

	Acres.
Main Channel is	4,834
Tatry do.	2,063
Do. extension of cultivation contemplated and provided for by works in progress	1,500
Total, Acreage	8,397

4. Owing to the imperfect way in which the water registers have been kept, and to the river not having been in fresh during the time Captain Hasted's investigations were in progress, much difficulty has been experienced in calculating the river discharge, and in ascertaining the supply of water actually received by the main channel under the Amurthay Anicut. In two Appendices, A. and B., to the Report, these particulars are given however as accurately as is at present possible, though confessedly the results are only an approximation, which that officer con-

siders errs, if at all, in showing a larger quantity of water than was really carried by the river. The total quantities discharged over the anicut, in the several years for which any definite information has been obtained, are—

	Millions of cubic yards.
1865 ...	32·42
1866 ...	482·68
1867 ...	8·49
1868 ...	7·96

Average rain-fall at Madras for sixty-four years 47·82 inches.

It has also been ascertained that water passed over the anicut in July and November 1859, but for how many days there is no information.

Rain-fall at Madras 27·64.

In 1860 no water passed over.

Do. do. 37·19.

In 1861 there was a discharge over the anicut on nineteen days, the greatest height above crown being four feet on one day.

Rain-fall at Madras 38·18.

In 1862, the anicut being then five feet high (it was raised to seven feet in 1865), the river was above the crown on seven days, two and a half feet being the greatest depth on the crown.

No details are given in the Appendix, or in the body of the Report, regarding the years 1863 and 1864, but from the diagram* it will be seen that the water was above the crown of the weir on seven days in the former, and on twenty-five days in the latter year. The quantities carried by the main channel are thus given:—

* See also Superintending Engineer's letter, para. 7.

	Millions of cubic yards.
1865 ...	59·34
1867 ...	37·81
1868 ...	22·62

For 1866 the *data* have been found insufficient to enable any calculations to be made.

5. It appears that the year 1866, in which 482·68 millions passed over the anicut, was an extraordinary one, and that the only other year in which similar floods are known to have been experienced was 1854. The years 1867 and 1868 were remarkably dry years, and the supply of water in the river was so small, that it reached only ten miles* down the main channel. The year 1865, in which 32·42 millions passed the anicut, is, Captain Hasted states, allowed to have been a good one, and the cultivation under the Cheyaur Channel was more extensive than in any other of the last five years; he explains that the season was favourable, not merely on account of the actual total quantity of water supplied by the river, but because the freshes lasted a considerable time, and furnished the supply just when it was of the most value for cultivation. The total discharge of the river imme-

* Out of 21¾ miles.

diately above the anicut in this year was 91·76 millions, and, in the event of a failure of local rains, very nearly the whole of this water would be needed for the existing or expected irrigation; but it is, as mentioned in the Report, tolerably certain that, in the case of a river like the Cheyaur, the freshes are dependent upon local rain-fall, and therefore in a good year the cultivation would require, in aid of the natural drainage into the tanks, a quantity very much below that* which would have to be stored were the supply obtained once for all, and from only one source, while in a bad year the drainage and river supplies are equally liable to fail

* 10,000 cubic yards an acre.

6. There does not appear to be any way of ascertaining what the actual requirements of the cultivation depending upon the Amurthay Anicut are, except by finding out the capacity of each tank supplied from the main channel, and then, with reference to the actual circumstances of the arrangements, seeing what quantities of water are needed to secure the cultivation under each. The channels do not run above all the tanks supplied, but into and then out of some of them, and the result of this imperfect arrangement is that the lower tanks get no water until after those above have been entirely filled. It will be observed that proper registers have been established, and that, from this year, something much more definite will be obtainable regarding the quantities of water available and used. It is by no means certain, for instance, that all the water, nearly sixty millions of cubic yards, which passed down the main channel in 1865, was utilized. The probabilities are that a considerable portion was either returned to the river at some point lower down, or carried by surplus channels into tanks not supposed to be supplied from the anicut. If that quantity was all needed for the cultivation under the anicut, and if 1865 may be taken as a good average year, it would follow that only about thirty-two millions of cubic yards would be available for other cultivation, and that only so much of this as could be carried by new channels in seven days could be utilized. Captain Hasted indeed (para. 12) supposes that the Amurthay main channel will, when the extensions now in progress are completed, carry half a million a day more than it has hitherto drawn off from the river, but that this will be the case is not quite clear. However, the diagram of the river shows very conclusively the extremely short duration of freshes containing any considerable surplus, and consequently that to utilize any material proportion of this surplus, the channels must be large, and, therefore, costly. Were a channel, with a width at sole of fifty feet, and carrying a depth of seven feet of water, cut with a fall of two feet per mile, the velocity of the water would be just under three miles an hour, and the discharge about 230,000 cubic yards per hour, or five and a half millions per diem. With a channel of this kind, on each side of the river, nearly all the surplus water of an ordinary year might be turned to account; but the channels would be full for only one day in the year, and of course it would never pay to make them of such a capacity. Captain Hasted estimates the cost at Rupees three lacs in round numbers. With proper arrangements in an average year thirty millions of cubic yards might be carried from an upper anicut, but the river supply in an average year will not do as the basis for calculating the average supply carried by the channels, seeing that in an exceptionally good year the carrying capacity of the channels can be increased only in one way—namely, by the longer duration of the freshes, and not by any

enhancement of their volume, while in a bad year there will be little or no water to be drawn off. Perhaps, therefore, more than twenty-five millions of cubic yards could not be safely expected; but, on the other hand, as the additional supply is intended to supplement that now existing, it is possible that 5,000 cubic yards per acre would be a sufficient allowance, and, if so, the supply would do for 5,000 acres. Rupees 3-12-0 are taken in the Report as the average assessment per acre, and this is based on the details given for the Tatry Channel; but on turning to Appendix C. it would seem that the average assessment of the nunjah lands, and there are more of these out of cultivation than water can be found for, is about 5 Rupees, so that the gross returns might be put at 25,000 Rupees. The cost of maintenance would, however, be far greater than that given in para. 20 of the Report. The establishment for distribution would be not less than double that named, for there would be sluices for the several tanks to be looked after, and the repairs of channels and tanks would amount to a considerable sum. It may be added that in Captain Hasted's estimate the provision, Rupees 5,000, for the improvement of tanks appears to be altogether inadequate, seeing that his reduced scheme supposes the division of the thirty millions between only a very few tanks.

7. The imperfect information already obtained does not favour the supposition that an upper anicut at Mambaukum, to supply either a large number or a few tanks, could be successfully carried out, but there is no reason that we should not, but every reason why we should, know more about the river, and about the supply to, and the cultivation under, the Amurthay Anicut and its tanks, and the proper course to adopt appears, therefore, to be to set to work to obtain this information which cannot fail to be useful, even should it demonstrate that no upper anicut is feasible. What should be done therefore is,

1st.—To take care that the registers at the Cheyaur Anicut are properly kept, and that they give all the *data* needful for ascertaining, with accuracy, both the supply to the main channel, and the surplus passing over the anicut. The discharge of the main channel should be checked by observation of actual velocities.

2nd.—A plan of all the channels and tanks on a scale of two inches to the mile should be prepared, and this should show the whole of the system, together with the position of the cultivation under each tank.

3rd.—Longitudinal sections of all the channels, with as many cross sections as may be necessary, should be prepared either from existing levels or, when necessary, from levels taken for the purpose, and it will be necessary to be careful that the effect of backwaters from tanks, and any other causes affecting the discharge of the channels, should be duly ascertained and noted.

4th.—The capacity of each tank should be ascertained by running two or three complete contours for each, with such cross sections of the bed as will enable the contents of the tanks at intermediate levels to be approximately calculated and tabulated. Every tank should be provided with one or more gauges, so that the actual level of the water may be recorded from time to time, and that a knowledge may be gained of the actual supplies received from rain-fall, and from the river respectively.

5th.—A statement of the ayacut, area, and assessment of all the tanks should be prepared, together with particulars of the cultivated area, assessment, remissions, and collections from the time of the construction of the anicut until now, and hereafter the same particulars should be recorded year by year.

6th.—A memorandum should be drawn up explanatory of the works, of the way in which they have been managed, of improvements in the system which may appear to be called for, etc. Particular attention should be given to any differences there may appear, or be found, to be in the quantity of water used for a given area under different tanks, so that it may be seen whether there is any considerable waste needing to be remedied.

7th.—Instructions should be drawn up for the proper keeping of registers, management of distribution, recording of the supply in the tanks, etc.; and these instructions should provide for due attention being paid to every detail which may be essential to a proper management of the water-supply.

8. If the points noticed be duly attended to, there will be, in the course of four or five years, ample information on which to decide to what further extent the Cheyaur freshes can be utilized, and without such information it does not appear to be practicable to attempt the construction of an upper anicut on this river. Moreovoer, the results btained from the weir built in 1852 will be the best guide to those which may be expected from any other similar work. A project for a lower anicut, which would utilize the waters of the Seeaur, as well as the surplus of the Cheyaur, has been partly investigated, but at present there are no *data* on which to base an opinion as to its probable utility.

Superintending Engineer's letter, para. 20.

9. It will be well to examine more thoroughly, than has as yet been done, the upper parts of the Cheyaur and Seeaur, with a view to ascertain whether the construction of one or more reservoirs to store flood-water would be economically practicable. The diagram of the freshes does not afford much encouragement in this direction, but the storage of even twenty or twenty-five millions of cubic yards would probably render secure, in most seasons, the whole irrigated area under the Amurthay Anicut. Captain Hasted had been able to find only one site at all promising, and that is on the head-waters of the Seeaur, and it would seem that the Arnee Jaghiredar has claims upon the waters of that river.

10. In the meantime it may be found practicable to improve the supply of the Polur tank by improving the existing channel from the Cheyaur, and, if an inexpensive rough-stone dam can be formed, this might be carried out also.

11. A rain gauge should be kept at the Cheyaur Anicut, and the Range Officer should obtain the registers of rain-fall from Polur, and from any other places in the basin of the river where this information may be recorded.

12. It will be advisable also that all the old supply channels from the Cheyaur, both above and below the junction of the Seeaur, should be reported on, and the cultivation under them for a series of years ascertained. An upper anicut might affect many of these, and it would be necessary, therefore, to consider their requirements.

(Signed) J. MULLINS, Major, R. E.,
Acting Chief Engineer for Irrigation.

FORT ST. GEORGE,
21*st September* 1869.

APPENDIX A.

Statement of water that passed over Cheyaur Anicut in the year 1865 *to* 1868.

YEARS.	1865.	1866.		1867.		1868.	
Month and date.	Quantity discharged.	Month and date.	Quantity discharged.	Month and date.	Quantity discharged.	Month and date.	Quantity discharged.
	Cubic yards.		Cubic yards.		Cubic yards.		Cubic yards.
26th July...	5,91,786	1st Sept....	1,381,142	26th Aug.	3,549,726	5th June.	6,292,110
27th do. ...	394,524	2nd do. ...	2,367,144	27th ,,	3,250,780	6th ,,	1,669,656
30th do. ...	4,355,728	24th do. ...	2,366,083	21st Oct....	1,682,220	...	...
31st do. ...	1,669,656	25th do. ...	12,261,816	...	...	...	...
27th Nov...	13,225,560	26th do. ...	10,486,656	...	...	...	...
28th do. ...	3,551,508	27th do. ...	6,132,216	...	...	...	...
5th Dec. ...	8,632,152	28th do. ...	1,947,932	...	...	...	...
...	...	4th Oct....	765,259	...	...	...	...
...	...	5th do. ...	1,113,104	...	...	...	...
...	...	6th do. ...	1,530,518	...	...	...	...
...	...	7th do. ...	17,683,920	...	...	...	...
...	...	8th do. ...	11,560,215	...	...	...	...
...	...	9th do. ...	2,934,242	...	...	...	...
...	...	10th do. ...	14,315,678	...	...	...	...
...	...	11th do. ...	30,697,922	...	...	...	...
...	...	12th do. ...	18,024,186	...	...	...	...
...	...	13th do. ...	1,578,448	...	...	...	...
...	...	17th do. ...	18,339,020	...	...	...	...
...	...	18th do. ...	34,570,760	...	...	...	...
...	...	19th do. ...	28,419,782	...	...	...	...
...	...	20th do. ...	25,287,082	...	...	...	...
...	...	21st do. ...	26,644,048	...	...	...	...
...	...	22nd do. ...	12,260,616	...	...	...	...
...	...	23rd do. ...	32,491,736	...	...	...	...
...	...	24th do. ...	20,332,116	...	...	...	...
...	...	25th do. ...	4,947,534	...	...	...	...
...	...	5th Nov...	1,183,836	...	...	...	...
...	...	6th do. ...	1,669,656	...	...	...	...
...	...	16th do. ...	3,784,460	...	...	...	...
...	...	17th do. ...	6,723,420	...	...	...	...
...	...	18th do. ...	986,310	...	...	...	...
...	..	3rd Dec. ...	10,536,390	...	...	...	...
...	...	4th do. ...	36,905,592	...	...	...	...
...	...	5th do. ...	25,287,336	...	...	...	...
...	...	6th do. ...	22,895,289	...	...	...	...
...	...	7th do. ...	21,699,000	...	...	...	...
...	...	8th do. ...	9,196,416	...	...	...	...
...	...	9th do. ...	1,380,834	...	...	...	...
Total...	32,420,914	...	482,687,714	...	8,482,726	...	7,961,766

ARNEE,
31*st July* 1869.

(Signed) J. O. HASTED, Captain, R.E.,
Executive Engineer, Polur Range.

(Signed) J. BEAN, Lieut.-Colonel, R.E.,
Acting Superintending Engineer, 4th Division.

APPENDIX B.

Discharge of Cheyaur Main Channel.

Months.	1865. No. of days there was water in channel.	1865. Amount discharged, cubic yards.	1867. No. of days there was water in channel.	1867. Amount discharged, cubic yards.	1868. No. of days there was water in channel.	1868. Amount discharged, cubic yards.
January	1	25,792	26	6,502,304	3	2,36,032
February	...	...	8	934,080	...	...
March	...	...	...	...	...	...
April	7	4,738,208	...	...	...	...
May	11½	4,910,208	5	224,512	...	...
June	2	3,44,320	...	* 5,226,316	4½	7,372,862
July	11	20,059,136	3	4,57,440	...	...
August	6	7,484,832	6	5,482,016	3	77,376
September	...	...	11	2,454,592	11	6,025,504
October	...	...	19	15,741,888	13	6,903,136
November	10	10,286,928	2	2,10,240	7½	2,007,328
December	14	11,494,588	4	5,77,056	...	...
Total...	62½	59,344,012	84	37,810,444	42	22,622,238

* Head-sluices closed up to 7th July, average entered.

ARNEE,
31*st July* 1869.

(Signed) J. O. HASTED, Captain, R.E.,
Executive Engineer, Polur Range.

(Signed) J. BEAN, Lieut.-Colonel, R.E.,
Acting Superintending Engineer, 4th Division.

APPENDIX

Statement of Cultivation under

Village No.	Talook.	Name of Tanks.	Ayacut.		Actual Cultivation			
					1862-63.		1863-64.	
			Acres.	Assessment.	Acres.	Cost.	Acres.	Cost.
		Northern Channel.		RS. A. P.		RS. A. P.		RS. A. P.
131	Polur ...	Maumbaukum Tank ...	40	294 7 0	34	269 7 9	30	215 3 7
...	Do. ...	Coonnathoor do. ...	28	160 0 8	13	79 4 5	13	79 4 5
66	Do. ...	Modiyanmungalum Chittary	125	635 6 7	125	634 1 4	125	634 1 4
166	Do. ...	Eachumpoondy Tank ...	34	176 2 10	34	176 2 10	34	176 2 10
56	Do. ...	Moothoor do. ...	15	46 8 0	4	15 1 3	4	15 1 3
106	Do. ...	Poovamput do. ...	35	180 15 4	34	177 12 3	22	116 10 4
67	Do. ...	Sholaveram do. ...	93	634 0 2	80	527 15 2	68	491 11 3
79	Do. ...	Ealathoor do. ...	201	1,335 15 8	167	1,104 2 6	166	1,098 8 4
73	Do. ...	Perayemputtoo do. ...	37	223 0 2	27	226 7 10	23	232 5 1
121	Do. ...	Poondy do. ..	94	442 7 10	90	469 15 9	94	481 9 6
72	Do. ...	Vumiyanoor do. ...	172	685 10 2	91	367 8 3	85	344 0 7
63	Do. ...	Calasapaukum do. ...	18	77 5 10	15	63 8 10	16	70 14 2
120	Do. ...	Canpaloor do. ...	492	2,156 11 3	353	1,550 4 5	310	1,358 12 10
11	Do. ...	Podiyemputtoo do. ...	36	449 11 9	29	136 13 4	19	108 3 1
226	Do. ...	Nummiyendul do. ...	36	155 9 9	17	79 10 6	16	71 5 10
77	Do. ...	Koorenennalary do. ...	133	428 13 1	109	417 7 0	115	416 14 11
188	Do. ...	Poothoorompnt do. ...	34	139 14 5	33	161 12 5	34	157 15 4
123	Do. ...	Kanganoor do. ...	131	644 3 2	130	645 10 4	129	637 9 2
128	Do. ...	Poothoopolarum do. ...	57	270 7 8	47	230 12 8	49	238 1 0
89	Do. ...	Vussoor do. ...	53	199 0 11	51	192 2 3	50	216 7 10
1	Do. ...	Polur do ...	946	4,424 8 6	799	3,708 3 11	680	3,199 0 0
2	Do. ...	Motloor do. ...	59	377 9 2	56	352 1 0	56	353 12 2
150	Do. ...	Renderaputtoo do. ...	77	516 12 3	76	503 7 3	68	456 8 5
3	Do. ...	Allumghur do. ...	115	668 5 0	110	650 6 2	105	601 8 5
1	Do. ...	Japaraputtoo do. ...	28	95 0 0	28	95 0 0	26	89 0 0
51	Do. ...	Venmaney do. ...	76	387 9 6	47	230 5 6	45	227 3 3
149	Do. ...	Coonnathoor do. ...	170	1,116 11 3	155	1,021 10 7	159	1,044 7 4
29	Do. ...	Mooroogapody large do.	109	516 2 8	82	389 11 0	100	478 7 2
...	Do. ...	Do. Chittary ...	57	249 4 1	44	193 14 0	51	217 5 11
28	Do. ...	Ogoor large Tank ...	158	746 6 2	47	253 11 3	80	402 8 7
...	Do. ..	Do. Small do. ...	49	221 12 11	47	211 1 8	35	199 3 3
...	Do. ...	Do. do. ...	14	61 2 5	...	....	...	......
35	Do. ...	Male Curiconthoor do....	96	611 8 5	75	502 15 3	43	302 6 8
191	Do. ...	Keel Curiconthoor do....	86	394 15 11	86	394 2 4	84	386 13 2
30	Do. ...	Thiroomala Chittary ...	32	133 3 7	24	112 2 10	24	94 12 9
33	Do ...	Vumbaloor Tank ...	180	943 0 0	143	553 13 3	132	696 10 8
78	Do. ...	Ariathoor do. ...	154	829 1 2	109	556 15 6	108	553 1 8
		Total ...	4,270	21,629 9 3	3,411	17,255 10 7	3,198	16,463 12 1
		Jahaghur Tanks.						
		Conavuttoo Tank ...	......	......	......	......	......	......
		Thuchoor do. ...	......	......	......	......	......	......
		Vumamungalum do. ...	......	......	......	......	......	......
		Southern Channel.						
...	Trinomalay...	Damarapaukum Tank ...	166	1,310 12 5	146	1,032 2 4	144	1,024 1 1
...	Do. ...	Malepathary do. ...	75	1,025 14 6	167	833 11 10	167	835 11 8
71	Polur ...	Keelpathary do. ...	45	220 4 10	43	209 10 10	43	210 6 5
70	Do. ...	Agarum do. ...	43	197 9 5	41	187 0 4	41	187 0 4
...	Trinomalay...	Moothoorusumpoondy do.	54	314 15 9	49	288 11 11	50	290 0 9
65	Polur ...	Poluncovil do. ...	68	447 3 10	38	303 11 8	40	301 7 1
...	Trinomalay...	Narthampoondy do. ...	181	908 13 7	148	750 13 8	145	738 11 2
122	Polur ...	Pilloor do. ...	138	717 9 3	120	722 2 3	121	714 10 2
64	Do. ...	Pullipnt do. ...	51	130 3 11	46	123 11 7	46	118 1 6
...	Trinomalay...	Nayodoomungalum do	87	338 15 6	66	264 12 11	63	254 11 2
...	Do. ...	Siroo Calampody do.	31	168 8 8	29	161 13 1	29	159 4 1
...	Do. ...	Movundul do. ...	54	337 4 8	13	80 2 5	13	80 2 5
...	Do. ...	Davanamputtoo do. ...	66	406 2 8	66	435 7 6	64	416 5 8
...	Do. ...	Aundavuttoo do. ...	152	443 4 3	147	434 9 0	145	432 2 6
..	Do. ...	Pooloothoor do. ...	276	233 5 7	115	532 5 2	109	507 15 6
...	Do. ...	Murthambody large do.	119	507 4 4	70	297 13 5	60	252 8 5
...	Do. ...	Do. Chittary ...	18	74 5 0	16	70 6 3	14	62 10 3
...	Do. ...	Kariyendul Tank ...	33	79 5 11	6	18 13 11	5	13 7 3
...	Do. ...	Saracolathoor do. ...	258	1,702 7 8	110	698 10 7	109	690 8 10
...	Do. ...	Do. Chittary ...	158	1,015 13 2	83	521 1 9	65	396 12 3
...	Do. ...	Salanoor Tank ...	......	......	...	......	...	......
164	Polur ...	Camloor do. ...	39	223 10 6	38	220 11 7	38	219 10 7

Public Works Department, 8th December 1869.

C.

proposed Maumbaukum Channel.

AND REVENUE.

1864-65.		1865-66.		1866-67.		Uncultivated Nunjah in the highest of five years.	Punjah can be converted into Nunjah.	Waste land can be brought to Nunjah.
Acres.	Cost.	Acres.	Cost.	Acres.	Cost.			
	RS. A. P.		RS. A. P.		RS. A. P.			
35	273 14 4	38	293 14 1	38	291 0 10	2 0 0	1 0 0	......
14	79 4 5	14	79 4 5	14	79 4 5	14 0 0	8 0 0	......
125	635 6 7	125	635 6 7	125	635 6 7	......	66 0 0	7
34	176 2 10	34	176 2 10	34	176 2 10	......	24 0 0	......
4	15 1 3	4	15 1 3	14	44 10 3	1 0 0	20 0 0	51
32	164 4 5	34	175 15 4	33	172 3 4	1 0 0	26 0 0	......
80	541 2 2	81	544 9 5	76	522 15 5	12 0 0	56 0 0	......
140	935 11 8	147	978 13 7	159	1,049 4 7	54 0 0	40 0 0	......
31	288 2 9	34	225 4 7	37	290 2 7	......	15 0 0	9
94	468 4 5	94	479 2 4	94	477 2 8	......	11 0 0	4
90	361 6 0	90	360 11 5	90	369 11 6	82 0 0	7 0 0	65
18	75 13 5	15	66 5 4	17	81 15 7	...	20 0 0	......
341	1,489 5 11	317	1,386 12 4	440	1,911 5 1	52 0 0	50 0 0	27
28	111 3 8	29	119 5 3	25	110 10 11	7 0 0	11 0 0	3
15	75 0 0	17	82 8 0	16	71 10 2	19 0 0	......	19
123	447 0 0	122	442 15 0	121	443 7 4	10 0 0	33 0 0	......
31	180 0 9	20	98 12 9	34	169 11 3	......	25 0 0	......
111	550 13 8	100	492 15 0	130	652 11 2	......	34 0 0	......
50	241 12 0	42	199 15 8	50	252 0 10	7 0 0	14 0 0	......
51	249 12 5	47	180 10 5	50	221 2 3	2 0 0	9 0 0	2
660	3,034 0 9	551	2,491 2 11	852	3,948 3 5	94 0 0	67 0 0	93
55	345 0 3	51	320 14 7	56	354 15 10	3 0 0	12 0 0	......
67	451 7 11	40	359 9 6	73	487 7 4	......	18 0 0	3
111	643 6 8	86	492 5 6	113	656 6 5	2 0 0	9 0 0	......
25	84 4 4	11	37 15 2	28	95 0 0	......	20 0 0	......
26	139 3 0	33	168 5 8	49	240 0 0	28 0 0	21 0 0	......
161	1,054 4 3	135	907 13 0	160	1,051 7 10	9 0 0	114 0 0	48
103	491 12 11	92	441 12 8	91	433 3 2	6 0 0	26 0 0	90
52	229 1 4	48	207 13 3	54	235 6 7	3 0 0	4 0 0	......
94	473 10 1	75	397 4 0	141	673 1 1	17 0 0	17 0 0	35
47	211 8 4	47	213 7 8	48	216 5 0	1 0 0	......	......
...	......	8	32 14 7	7	32 14 7	6 0 0	10 0 0	6
61	413 12 6	58	403 3 5	74	502 12 3	21 0 0	48 0 0	4
85	384 13 11	83	381 12 7	85	388 3 7	......	1 0 0	1
9	24 8 0	10	34 2 6	7	24 2 2	8 0 0	6 0 0	1
132	696 10 8	130	681 2 4	180	943 11 11	......	......	26
101	516 12 9	97	504 11 7	99	511 5 11	45 0 0	......	29
3,236	16,554 0 4	2,959	15,111 0 6	3,714	18,817 6 8	506 0 0	843 0 0	523
......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......
145	1,014 7 1	146	1,023 1 7	98	943 13 3	19 2 1	17 8 0	......
161	792 3 6	157	772 9 2	160	782 2 8	30 8 0	46 8 0	......
43	210 6 5	43	210 6 5	43	210 6 5	2 0 0	13 0 0	......
41	189 11 7	31	147 11 7	40	184 1 1	2 0 0	12 0 0	......
46	265 14 0	49	280 10 10	47	273 14 1	1 14 0	10 0 0	......
35	256 14 1	21	129 2 10	24	123 14 2	28 0 0	34 0 0	......
138	695 2 5	143	708 14 0	137	687 12 0	26 11 2	15 0 0	......
122	143 3 3	117	623 12 2	122	745 7 3	16 0 0	28 0 0	......
46	125 3 3	46	118 1 6	46	136 4 0	5 0 0	10 0 0	......
56	225 15 0	60	237 12 8	65	252 12 8	6 8 0	14 4 0	......
28	150 8 6	29	158 5 9	27	151 5 9	......	20 0 0	......
7	47 7 1	7	48 2 2	16	96 4 5	13 12 1	15 0 0	......
50	304 9 8	66	405 2 11	26	162 4 10	......	20 0 0	......
144	418 12 0	145	416 14 0	145	419 6 11	4 7 0	25 0 0	......
102	470 13 1	104	477 4 4	110	501 2 9	91 10 3	......	......
63	264 15 3	64	267 1 0	72	290 2 7	31 4 0	......	......
15	63 13 8	13	57 3 4	15	64 2 8	......	8 10 0	......
4	11 1 6	4	9 12 9	9	21 14 0	15 0 2	12 8 0	......
106	667 9 3	93	574 6 2	113	586 6 5	107 7 2	22 5 2	......
68	423 10 0	64	387 15 5	82	503 8 5	48 15 2	3 12 0	......
...	......	...	......	...	......	57 4 2	......	......
38	219 6 7	37	213 15 8	38	232 9 0	1 0 0	53 0 0	1

Statement of Cultivation under

Village No.	Talook.	Name of Tanks.	Ayacut. Acres.	Ayacut. Assessment. RS. A. P.	Actual Cultivation 1862-63. Acres.	Actual Cultivation 1862-63. Cost. RS. A. P.	Actual Cultivation 1863-64. Acres.	Actual Cultivation 1863-64. Cost. RS. A. P.
		SOUTHERN CHANNEL.—(Concluded.)						
46	Polur ...	Puthyvody Tank ...	141	687 15 2	82	393 1 4	74	361 13 5
...	Do. ...	Do. Chittary ...	40	223 1 10	33	165 6 4	33	169 0 1
93	Do. ...	Anavody Tank ...	7	28 15 6	6	28 15 6	6	28 15 6
91	Do. ...	Karayambody do. ...	47	228 1 3	21	102 5 4	21	104 4 2
176	Do. ...	Sanicomody do. ...	20	105 0 3	13	61 2 0	14	64 1 2
...	Do. ...	Do. Chittary ...	71	358 13 0	57	267 14 11	53	241 4 4
49	Do. ...	Karapoondy Tank ...	299	1,455 12 6	262	1,364 10 10	263	1,352 3 7
90	Do. ...	Kooralpaukum do. ...	106	520 15 4	81	494 2 4	80	402 10 4
161	Do. ...	Seethumput do. ...	34	207 3 8	24	145 0 5	20	121 5 1
32	Do. ...	Mundacolathoor do. ...	635	3,248 9 5	553	2,878 12 4	499	2,608 14 10
40	Do. ...	Calavoor do. ...	121	538 11 9	36	168 7 9	62	131 12 10
156 ...	Do. ... Do. ...	Chothoocrimny large do. ... } Do. Chittary ... }	111	707 5 7	78	466 13 6	77	477 2 5
177	Do. ...	Velapaukum Tank ...	142	729 4 8	140	697 2 7	132	640 8 3
81	Do. ...	Vodavelapaukum do. ...	54	281 13 5	47	224 3 6	50	255 5 0
175	Do. ...	Pelachoor do ...	265	1,390 0 8	219	1,145 6 9	174	909 13 7
160	Do. ...	Genganoor do. ...	44	184 14 11	36	151 11 5	37	155 8 2
92	Do. ...	Lodavirum do. ...	76	462 12 3	58	365 0 4	46	290 4 5
47	Do. ...	Canniputtoo do. ...	49	290 0 4	37	217 2 10	33	193 6 9
159	Do. ...	Annially do. ...	295	1,398 10 11	87	438 13 11	82	416 15 5
...	Trinomalay ..	Parcomum do. ...	55	289 14 6	4	23 4 6	5	31 7 6
...	Do. ...	Do. large do. ...	136	698 11 8	111	589 9 11	75	391 2 6
...	Do. ...	Soorungooppum do. ...	16	71 2 6	10	46 7 3	9	41 13 4
...	Do. ...	Camalapoothoor do. ...	109	508 4 0	32	151 15 6	24	116 3 0
...	Do. ...	Do. Chittary.	......	......	......	......	......	......
...	Do. ...	Velagoomundul large Tank	60	269 4 9	56	255 7 5	56	254 0 9
...	Do. ...	Do. Chittary.	......	......	......	......	......	......
44	Polur ...	Podiyembuthoor Tank...	42	261 7 8	34	202 1 9	27	146 1 2
...	Trinomolay ..	Arapaukum do. ...	73	326 0 2	55	245 7 4	52	223 15 3
...	Do. ...	Do. large do. ...	......	......	......	......	......	......
...	Do. ...	Mungalum do. ...	187	581 13 3	140	450 2 1	139	446 13 1
50	Polur ...	Podagum do. ...	93	507 4 8	93	504 5 7	93	504 6 1
...	Do. ...	Do. Chittary ...	56	264 13 8	53	250 5 5	52	238 12 10
43	Do. ...	Alangaramungalum Tank	86	459 2 11	79	424 0 8	89	440 6 0
39	Do. ...	Semmiyamungalum do.	135	638 9 10	106	504 11 4	105	502 10 1
38	Do. ...	Allialamungalum do. ...	238	1,284 0 7	203	1,127 11 4	211	1,168 7 3
48	Do. ...	Muttaporayoor do. ...	56	286 13 3	51	263 0 2	51	263 0 2
178	Do. ..	Monsoorabad do. ...	20	104 9 0	......	......	......	......
41	Do. ...	Peranumbaukum do. ...	95	534 0 7	87	501 11 11	89	508 10 6
205	Do. ...	Chinna Authoray ...	66	354 12 11	60	329 3 2	60	329 3 2
204	Do. ...	Peria do. ...	174	921 7 6	126	668 14 4	125	693 10 9
202	Do. ...	Seeyamundul Tank ...	79	438 2 1	44	247 0 5	49	268 10 4
208	Do. ...	Thuchanubody do. ...	127	836 15 3	80	536 8 8	92	615 1 6
200	Do. ...	Thavimungalum do. ...	101	641 11 0	47	310 0 6	53	350 13 9
207	Do. ...	Numbodoo do. ...	99	602 3 9	80	492 6 9	82	500 10 1
217	Do. ...	Marthambody do ...	85	564 3 4	72	463 12 2	70	457 4 2
222	Do. ...	Appadoo do. ...	109	624 11 1	90	535 10 6	94	557 14 2
215	Do. ...	Kothundavody do. ...	61	364 5 2	58	341 13 8	59	362 5 2
...	Do. ...	Do. Chittary ...	76	462 4 8	63	370 10 5	65	373 5 2
...	Trinomalay ..	Camvoor Tank ...	82	417 9 10	54	277 14 7	51	266 2 7
...	Do. ...	Vodunthavody do. ...	149	975 10 1	91	576 5 2	89	571 3 9
...	Do. ...	Carcoonum do. ...	162	734 4 7	105	432 15 4	93	428 2 10
			......	......	......	......	......	......
	Do. ...	Tanks omitted by Captain Hasted ...	....	....	....	....	....	....
		Total ...	7,496	38,886 7 1	5,521	29,088 7 9	5,326	27,884 1 4
		Tindivanum Talook ...	11,766	60,516 0 4	8,932	46,344 2 4	8,524	44,347 13 5 ......
		Total, Acres ...	......	......	......	......	......	......

ARNEE,
31*st July* 1869.

Public Works Department, 8th December 1869.

proposed Maumbaukum Channel.—(Concluded.)

AND REVENUE.

1864-65.		1865-66.		1866-67.		Uncultivated Nunjah in the highest of five years.	Punjah can be converted into Nunjah.	Waste land can be brought to Nunjah.
Acres.	Cost.	Acres.	Cost.	Acres.	Cost.			
	RS. A. P.		RS. A. P.		RS. A. P.			
94	460 7 4	76	374 10 8	86	427 6 10			
23	108 2 7	32	148 10 2	36	164 6 5	47 0 0	20 0 0	47
6	28 15 6	6	28 15 6	6	28 15 6	4 0 0	......	......
13	66 5 6	17	85 3 3	15	75 0 4	......	......	......
14	66 2 3	9	57 11 10	18	95 2 6	26 0 0	......	27
45	213 13 6	22	91 14 1	48	216 12 8	2 0 0	......	17
268	1,343 13 10	248	1,305 15 1	247	1,303 4 8	14 0 0	......	......
80	469 8 11	75	491 1 4	80	486 15 5	31 0 0	14 0 0	200
13	79 10 3	9	59 15 3	12	74 0 0	24 0 0	6 0 0	19
365	1,926 3 10	298	1,597 7 1	544	2,845 13 11	10 0 0	......	18
51	232 14 11	54	247 4 3	52	227 0 9	82 0 0	70 0 0	128
						59 0 0	......	......
75	449 2 0	71	425 13 7	66	391 1 4	33 0 0	6 0 0	106
135	650 0 4	131	629 2 2	141	662 9 8			
49	258 6 3	50	258 2 1	51	155 11 2	1 0 0	38 0 0	85
182	953 11 4	141	734 2 8	208	1,078 11 9	4 0 0	......	......
38	157 15 7	39	162 15 8	38	162 14 1	46 0 0	8 0 0	42
47	297 14 6	35	222 11 6	43	270 5 10	5 0 0	......	55
32	198 10 6	29	170 8 4	45	268 8 4	28 0 0	30 0 0	20
75	390 3 1	72	362 13 0	90	454 9 2	4 0 0	1 0 0	25
7	43 3 7	8	49 0 2	10	60 12 11	205 0 0	3 0 0	188
70	373 6 5	79	406 13 8	91	499 2 2	34 2 2	......	......
9	41 4 3	10	40 6 7	12	54 2 5	14 4 3	......	......
29	129 13 3	44	119 4 1	50	229 0 1	1 0 0	......	......
......	......	......	......	......	......	30 2 0	......	......
						10 0 0	......	......
54	247 6 5	54	247 14 0	55	246 1 5	1 3 1	11 8 0	......
......	......	......	......	......	......	......	15 0 0	......
25	136 13 5	15	94 12 4	19	111 0 8	8 0 0	......	......
51	211 5 6	59	255 9 9	50	221 0 4	24 6 1	......	......
......	......	......	......	......	......	8 9 2	20 0 0	......
139	446 13 1	165	459 13 9	162	454 2 6	4 0 0	......	......
86	471 1 1	83	449 5 8	90	490 10 10	......	......	......
48	222 1 0	53	248 11 8	55	265 15 0	1 0 0	1 0 0	50
90	439 10 11	90	439 10 11	90	439 10 11	......	72 0 0	35
83	591 11 9	80	379 13 11	121	581 5 3	14 0 0	121 0 0	20
198	1,092 0 0	198	1,092 0 0	205	1,126 3 6	27 0 0	9 0 0	141
52	266 15 6	52	266 15 6	51	264 12 3	4 0 0	25 0 0	128
......	......	......	......	......	......	20 0 0	5 0 0	8
76	464 7 9	68	401 12 10	82	441 11 0	6 0 0	......	28
60	329 3 2	60	333 13 3	61	334 15 5	5 0 0	26 0 0	11
131	730 12 4	142	787 8 0	117	666 11 8	32 0 0	1 0 0	2
37	216 12 6	40	231 14 6	35	203 1 11	30 0 0	11 0 0	19
95	635 6 3	99	657 15 4	98	648 2 6	28 0 0	13 0 0	......
63	406 11 5	64	409 8 1	63	401 9 6	37 0 0	......	95
80	469 0 2	79	481 4 4	74	449 1 6	17 0 0	7 0 0	19
69	476 11 2	75	484 9 7	75	484 9 7	10 0 0	23 0 0	31
98	576 0 0	98	574 3 3	96	577 2 7	11 0 0	6 0 0	3
59	362 5 2	55	336 6 7	59	362 5 2	2 0 0	......	15
67	384 0 0	62	381 13 7	62	352 12 1	9 0 0	6 0 0	6
58	294 9 10	61	306 7 4	41	207 1 10	......	5 0 0	16
86	548 11 9	113	730 9 6	113	731 8 6	8 4 0	......	......
83	378 6 0	94	378 12 4	82	361 12 11	17 8 2	......	......
								......
......	......	......	......	Total Trinomalay Cawnies ...	...	607 14 2	282 5 7	......
......	......	......	......	Or Acres	...	804 0 0	373 0 0	......
......	......	......	......	Do. do.	...	220 0 0	79 0 0	......
5,016	26,300 8 10	4,948	26,171 6 3	5,380	28,025 12 1	940 0 0	671 0 0	1,605
8,252	42,854 9 2	7,907	41,282 6 9	9,094	46,843 2 9	2,470 0 0 860 0 0	1,966 0 0 340 0 0	2,128 ......
......	......	......	......	......	......	3,330 0 0	2,306 0 0	2,128

(Signed) J. O. HASTED, Captain, R. E.,
Executive Engineer, Polur Range.

No. 124. ORDER THEREON, 8th December 1869, No. 3,854.

IRRIGATION, No. 4.

AMONGST the many irrigational projects which have been pressed upon the attention of Government by various Revenue-officers, perhaps not one has, at different times and by different persons, been more strongly urged on account of its supposed useful and remunerative character, in comparison with its size, than the scheme for the construction of an anicut across the Cheyaur near Mambaukum in the North Arcot District which is reported on in these papers. The work was represented as being calculated not only to improve and extend cultivation in the Polur and Wandiwash Talooks of that district and in a part of South Arcot, but as being essential for the protection of a wide tract of country from the effects of the failure of the rains and from the distress which must result from such a contingency.

See paragraph 6 of memorandum by Mr. Robinson, recorded in Revenue Proceedings dated 3rd February 1868, No. 308.
See also despatch from Secretary of State, recorded in Revenue Proceedings, No. 1,244, dated 6th May 1868.

2. Although the existence of an anicut across the same river at a village named Amurthay, some twenty miles below Mambaukum, rendered it problematical whether there would be water to spare for diversion by another work of the same description higher up, the Government took the earliest opportunity of means for investigating the project being at their disposal to cause the scheme to be thoroughly examined. The result is now submitted by the Acting Chief Engineer, and after the most careful consideration the Government are of opinion that it has been clearly established that, in all ordinary seasons, the discharge of the Cheyaur is not more than is sufficient to supply water for distribution from the present anicut at Amurthay and from other old standing channels. These draw off, and already utilize in average years, a large proportion of the more or less precarious supply which the river can give to tanks on either side, and though, in exceptionally good years, they may not be able to do this, but allow a considerable volume of water to escape, the Government are not satisfied that it will be expedient to undertake the construction of a system of expensive works on the contingency that they may now and then be useful. They have little confidence that the desired improvement of irrigation in North Arcot will be effected by the construction of an anicut at Mambaukum, but they hope that the result of the further inquiries that are being prosecuted to ascertain how far it will be advantageous to erect a second anicut below the junction with the Cheyaur of its large northern branch, the Scear, will be more favourable.

3. The Acting Chief Engineer reports that arrangements have been made for the proper record of the extent and duration of the freshes, and for ascertaining how much of the Cheyaur water is utilized by the Amurthay Anicut Main Channel, and how much passes over the anicut. He proposes also that the circumstances and requirements of the irrigation under the Amurthay Anicut, which he points out are peculiar, should be carefully and systematically examined into, in order that the works may be placed on as satisfactory a footing as may be found practicable, and that the best data may be obtained for judging what quantity of

river-water, in addition to the supplies obtained by the tanks from local rain-fall, is really required. Major Mullins thinks that, at the end of four or five years, it will be possible to form a reliable opinion as to the value of the Cheyaur as a source of irrigation, and as to the amount of surplus water available for irrigation from an anicut lower down than Amurthay after providing for existing rights and claims.

4. The Government approve of these proposals, and the Superintending Engineer of the 4th Division will be instructed to make the necessary arrangements for carrying out the Chief Engineer's suggestions. Attention will at the same time be given to the Seear, to the investigations required to ascertain whether any of the flood waters of this river or of the Cheyaur can be stored in the hills in which these streams take their rise, to the improvement of the supply channel of the Polúr Tank, and of any other old channels which may be found capable of being rendered more efficient.

5. Colonel Bean should also take measures for ascertaining, in communication with the Collector of North Arcot, what the rights of the Arnee Jaghiredar, in respect of the water supply of the Seear, may be; and, in order that the Government may be the better able to judge of the extent to which Cheyaur freshes, both above and below the junction of the Seear, are utilized, the Superintending Engineer is requested to obtain full information regarding all the channels on both banks of the river, with particulars of the cultivation under the tanks connected with them for a series of years.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the Superintending Engineer, 4th Division.
,, Chief Engineer for Irrigation.
,, Revenue Department.

Exd. F. R. Bantleman.

Govt. of {1869} Mad

PUBLIC WORKS.

To

THE SUPERINTENDING ENGIN

4TH DIV

&c., &c.

Dated December, 8th.

Recd. *Encl.*

G. O., 8th December 1869, *No.* 3,854.

DECEMBER.

Nos. 123-124

Anicut.—Passing orders on the letter from the Superintending Engineer of the 4th Division, relative to the project for the construction of an anicut across the Cheyaur near Mambaukum in the Nor[illegible] Arcot District.

No 275

29

Note by the Acting Chief Engineer for I[rrigation]

On his return from England in Ma[y]
last, Captain Hasted was deputed to comp[lete]
the investigation of the project for constructin[g an]
Anicut across the Cheyan, near the village [of]
Mambaukum, the object of the work being [the]
supply of a considerable number of Tanks [on]
both sides of the river in the Polur Taluq [of]
the North Arcot District. Surveys and le[vels]
had already been prepared in connection wi[th]
this project by Mr Bevan, and Captain
Hasted was furnished with instructions [to]
obtain the additional information required [to]
enable the merits of the scheme to be more
clearly understood, in order that the Govern
-ment might be in a position to decide wh[ether]
the construction of an upper anicut would [be]
likely to be attended with the beneficial [re]
sults, which certain Revenue Officers ha[d]
represented would be secured by it. Mr W[...]
Robin[son]

Print
No 3
27/9/69

Robinson, in a Memorandum dated 22nd January 1868, para 6, had specially drawn attention to this work, which he considered to be all important and absolutely indispensable to the welfare of the Polur Taluq; and the Secretary of State in noticing that report expressed the opinion that if Mr Robinsons statements were borne out, no time should be lost in commencing a work of such importance to the District, provided the claims of existing irrigation under the river could be duly secured.

Captain Hasted's attention was directed in the first instance to the ascertainment of the water supply of the river. The data for estimating the discharge were known to be very far from complete, but he was instructed to supplement them, as far as possible, by local enquiry, and to be careful to explain very fully how the conclusions at which he might arrive had been worked out. Then the requirements of the cultivation under the existing Cheyair Anicut were to be considered, and

P.M.G. R.D. 3rd Feby 1868 No 3
P.W.D. No 420-7th

P.M.G. R.D. 6 May 1868 No 1244
P.W.D. No 1717-17

and the best means of utilizing any surplus, [illegible]
might be found to be available, were to be rep[illegible]

3 This officer's report contains a short s[illegible]
of the circumstances of the river, & of the Anicut [illegible]
the village of Annithay which was built in 185[illegible]
and under which the channels have for sometime
been undergoing extension. It is shown that [illegible]
extent of land under the

Main Channel	is acres	4834
Jaty Channel	"	2063
Do Extension of cultivation contemplated and provided for by works in progress		1500
	Total acreage	8397

4 Owing to the imperfect way in wh[illegible]
the water registers have been kept, and to the ri[illegible]
not having been in fresh during the time Cap[illegible]
Hasted's investigations were in progress, much diff[illegible]
-culty has been experienced in calculating [illegible]
river discharge, & in ascertaining the supply of
water actually received by the Main Channel
unde[illegible]

under the Amurthay Anicut. In two appendices, A & B, to the report these particulars are given how-ever as accurately as is at present possible, though confessedly the results are only an approximation, which that officer considers errs, if at all, in showing a larger quantity of water than was really carried by the river. The total quantities discharged over the anicut, in the several years for which any definite information has been obtained, are

	Millions of cubic yards
1865	32·42
1866	482·68
1867	8·49
1868	7·96

It has also been ascertained that water passed over the Anicut in July & November 1859, but for how many days there is no information. (Average rain[fall] at Mad[ras] for 64 yea[rs] 47·82 inches.)

In 1860 no water passed over ——— (Rainfall Madra[s] 27·6[…])

" 1861 There was a discharge over the Anicut on 19 days, the greatest height above crown being 4 feet on 1 day. (do do 37·[…])

Dis

38

Rainfall Madras 38·18

In 1862, the Anicut being then 5 feet hig

(it was raised to 7 feet in 1865), th

river was above the crown on 7 day

2½ feet being the greatest depth on the c

No details are given in the Appendix or in

body of the report regarding the year 1863

See also Superintending Engineer's letter para 7

but from the diagram it will be seen that th

water was above the crown of the weir on 7 da

in the former, & on 25 days in the latter yea

The quantities carried by the Main Channel a

thus given

	millions of cubic yards
1865	59·34
1867	37·81
1868	22·62

For 1866 the data have been found insufficien

to enable any calculations to be made

5 It appears that the year 1866 in whi

482·68 millions passed over the Anicut was an

extraordinary one, and that the only other year

in which similar floods are known to have

been experienced was 1854. The years 1867 & 18

were

were remarkably dry years, and the supply of water in the river was so small, that it reached only 10 x miles down the main channel. The year 1865 in which 32·42 millions passed the Anicut is, Captain Hasted states, allowed to have been a good one, as the cultivation under the Cheyair channel was more extensive than in any other of the last 5 years; he explains that the season was favourable not merely on account of the actual total quantity of water supplied by the river, but because the freshes lasted a considerable time, and furnished the supply just when it was of the most value for cultivation. The total discharge of the river immediately above the anicut in this year was 91·6 millions, and, in the event of a failure of local rains, very nearly the whole of this water would be needed for the existing or expected irrigation; but it is, as mentioned in the report, tolerably certain that, in the case of a river like the Cheyair, the freshes are dependent upon local rainfall, and therefore in

x out of 21 3/4 m

in a good year the cultivation would require
aid of the natural drainage into the Tanks,
10,000 cubic yards an acre. quantity very much below that which would to
to be stored were the supply obtained once for
and from only one source, while in a bad year the d
-age & river supplies are equally liable to fail.

5 There does not appear to be any way o
ascertaining what the actual requirements of the
cultivation depending upon the Anunthay Anic
are, except by finding out the capacity of each
Tank supplied from the main channel, and
then, with reference to the actual circumstance
of the arrangements, seeing what quantities of
water are needed to secure the cultivation unde
each. The channels do not run above all the
Tanks supplied, but into and then out of some
of them, & the result of this imperfect arrangement
is that the lower Tanks get no water until after
those above have been entirely filled. It will be
observed that proper registers have been establish
and that from this year, something much
more

more definite will be obtainable regarding the quantities of water available and used. It is by no means certain for instance that all the water, nearly 60 millions of cubic yards, which passed down the Main Channel in 1865 was utilized. The probabilities are that a considerable portion was either returned to the river at some point lower down, or carried by surplus channels into tanks not supposed to be supplied from the Anicut. If that quantity was all needed for the cultivation under the Anicut, and if 1865 may be taken as a good average year, it would follow that only about [illegible] millions of cubic yards would be available for new cultivation, and that only so much of this as could be carried by new channels in 7 days could be utilized. Captain Hastel indeed (para 12) supposes that the Amuthay Main Channel will, when the extensions now in progress are completed, draw ½ a million a day more than it has hitherto drawn off from the river, but that this will be the case is not quite clear. However the diagram of the river shows very conclusively the

extremely

extremely short duration of freshes containing any considerable surplus, and consequently that to utilize any material proportion of this surplus the channels must be large, and therefore cos[tly]. Were a channel, with a width at sole of 50 feet & carrying a depth of 7 feet of water, cut with a fall of 2 feet per mile, the velocity of the water would be just under 3 miles an hour, and the discharge about 230 thousand cubic yards per hour or 5½ millions per diem. With a channel of this kind on each side of the river nearly all the surplus water of an ordinary year might be turned to account; but the channels would be full for only one day in the year, and of course it would never pay to make them of such a capacity. Captain Haste[d] estimates the cost at Rupees 3 lacs in round numbers. With proper arrangements in an average year 30 millions of cubic yards might be carried from an upper anicut; but the river supply in an average year will not do as the basis for calculating the

the average supply carried by the channels, seeing that in an exceptionally good year the carrying capacity of the channels can be increased only in one way, viz by the longer duration of the freshes, & not by any enhancement of their volume, while in a bad year there will be little or no water to be drawn off. Perhaps therefore more than 25 millions of cubic yards could not be safely expected, but on the other hand as the additional supply is intended to supplement that now existing, it is possible that 5000 cubic yards per acre would be a sufficient allowance, and, if so, the supply would do for 5000 acres. Rupees 3 3/4 are taken in the report as the average assessment per acre, and this is based on the details given for the Laty channel, but on turning to Appendix C it would seem that the average assessment of the nunjah lands, and there are more of these out of cultivation than water can be found for, is about 5 Rupees, so that the gross returns might be put at 25,000 Rupees. The

cost

cost of maintenance would however be far greater than that given in para: 20 of the report. The establishment for distribution would be not less than double that named, for there would be sluices for the several Tanks to be looked after, and repairs of channels & Tanks would amount to a considerable sum. It may be added that in Captain Hasted's estimate the provision, Rupees 5[illegible] for the improvement of Tanks appears to be altogether inadequate, seeing that his reduced scheme supposes the division of the 30 millions between only a very few tanks

6 The imperfect information already obtained does not favour the supposition that an upper [illegible] cut at Mambaukum to supply either a large number or a few Tanks could be successfully carried out, but there is no reason that we should not, but every reason why we should, know more about the river, & about the supply to and the cultivation under the Ammthay Anicut and its

its Tanks, and the proper course to adopt appears therefore to be to set to work to obtain this information, which cannot fail to be useful, even should it demonstrate that no upper anicut is feasible. What should be done therefore is,

1st to take care that the registers at the Cheyair Anicut are properly kept, and that they give all the data needful for ascertaining with accuracy both the supply to the Main channels and the surplus passing over the anicut. The discharge of the main channel should be checked by observation of actual velocities.

2nd A plan of all the channels & Tanks on a scale of 2 inches to the mile should be prepared & this should show the whole of the system, together with the position of the cultivation under each Tank.

3rd Longitudinal sections of all the channels, with as many cross sections as may be necessary should be prepared either from existing levels or, where necessary, from levels taken for the purpose,

and

and it will be necessary to be careful that
effect of backwaters from Tanks, and any
causes affecting the discharge of the channel
should be duly ascertained and noted.

4th The capacity of each Tank should be ascer-
-tained by running two or three complete con-
-tours for each, with such cross sections of the
bed as will enable the contents of the tanks
intermediate levels to be approximately calcu-
& tabulated. Every Tank should be provided
with one or more gauges, so that the actual
of the water may be recorded from time to t
and that a knowledge may be gained of
actual supplies received from rainfall, and
from the river respectively.

5th A statement of the ayacut, area & assessm
of all the Tanks should be prepared together
with particulars of the cultivated area, assess-
-ment, remissions & collections from the time
of the construction of the anicut until now,
and

and hereafter the same particulars should be recorded year by year

6th A memorandum should be drawn up explanatory of the works, of the way in which they have been managed, of improvements in the system which may appear to be called for &c. Particular attention should be given to any differences there may appear, or be found to be in the quantity of water used for a given area under different tanks, so that it may be seen whether there is any considerable waste needing to be remedied.

7th Instructions should be drawn up for the proper keeping of registers, management of distribution, recording of the supply in the Tanks &c, & these instructions should provide for due attention being paid to every detail which may be essential to a proper management of the water supply.

If the points noticed be duly attended

tended to there will be, in the course of 4 or 5 [y]
ample information on which to decide to what [...]
ther extent the Cheyaur freshes can be utilize[d]
and without such information it does not app[ear]
to be practicable to attempt the construction [of]
an Upper anicut on this river. Moreover the [re-]
sults obtained from the weir built in 1852 wil[l]
be the best guide to those which may be expect-
ed from any other similar works. A project fo[r]
a lower anicut, which would utilize the wat[er]
of the Suar, as well as the surplus of the Che-
[...]upg Engr's letter yaur, has been partly investigated, but at pre-
[...]arw 20. sent there are no data on which to base an
opinion as to its probable utility.

8. It will be well to examine more
thoroughly, than has as yet been done, the up-
per parts of the Cheyaur and Suar with a
view to ascertain whether the construction of one
or more reservoirs to store flood water would be

economicall[y]

economically practicable. The diagram of the freshes does not afford much encouragement in this direction, but the storage of even 20 or 25 millions of cubic yards would probably render secure, in most seasons, the whole irrigated area under the Amurthay anicut. Captain Hasted had been able to find only one site at all promising, and that is on the head waters of the Suar, and it would seem that the Arnee Jaghirdar has claims upon the waters of that river.

9. In the meantime it may be found practicable to improve the supply of the Polur Tanks by improving the existing channel from the Cheyaur, and, if an inexpensive rough stone dam can be formed, this might be carried out also.

10. A raingauge should be kept at the Cheyaur Anicut, and the Range officer should obtain the registers of rainfall

from

48

from Polur, and from any other places in the basin of the river where this information may be recorded.

11. It will be advisable also that the old supply channels from the Cheyaur, above and below the junction of the Suar, be reported on, and the cultivation under them for a series of years ascertained. An upper anicut might affect many of these, and it would be necessary therefore to consider their requirements.

Fort St George
21st September 1869.

(Signed) John Mullins Major
Acting Chief Engineer for Irrigation.

P. No. 4690/69.

Pros: 8th Decr/69 L a 123.

Report on the surve
across the upper bra
of the Cheyenne Riv

Ayacut.				Actual Cultivation and Revenue												
				1862/63				1863/64				1864/65				186[illegible]
Acres	Assessment			Acres	Cost			Acres	Cost			Acres	Cost			Acres
3	6			3	3							3	6			3
40	294	7	..	34	269	7	9	30	215	3	7	35	273	14	4	38
28	160	..	8	13	79	4	5	13	79	4	5	14	79	4	5	14
125	635	6	7	125	634	1	4	125	634	1	4	125	635	6	7	125
34	176	2	10	34	176	2	10	34	176	2	10	34	176	2	10	34
15	46	8	..	4	15	1	3	4	15	1	3	4	15	1	3	4
35	180	15	4	34	177	12	3	22	116	10	4	32	164	4	5	34
93	634	..	2	80	527	15	2	68	491	11	3	80	541	2	2	81
201	1335	15	8	167	1104	2	6	166	1098	8	4	140	935	11	8	147
37	223	..	2	27	226	7	10	23	237	5	1	31	288	2	9	34
94.	442	7	10	90	469	15	9	94	481	9	6	94	468.	4	5	94
172	685	10	2	91	367	8	3	85	344	..	7	90	361	6	..	90
18	77	5	10	15	63	8	10	16	70.	14	2	18	75	13	5	15
492	2156.	11	3	353	1550	4	5	310	1358	12	10	341	1489	5	11	317
36	449	11	9	29	136	13	4	29	108	3	1	28	111	3	8	29
36	155	9	9	17	79	10	6	16	71.	5.	10	16	75	..	..	17
133	428.	13	1	109	417	7	..	115	416.	14	11	123	447	..	..	12[illegible]
34	139	14	5	33.	161	12	5	84	157.	15	4	31	180	..	9	2[illegible]
131	644	3	2	130	645.	10	4	129	637	9	2	111	550	13	8	10[illegible]
								49	238	1	..	50	241.	12	..	4[illegible]

Ayacut.				Actual Cultivation and Revenue												
				1862/63				1863/64				1864/65				18[illegible]
Acres	Assessment			Acres	Cost			Acres	Cost			Acres	Cost			Acres
1864.	9336	8	3	1483	7526	1	1	1402	7160	14	8	1447	7359	10	8	1404
946	4424	8	6	799	3708	3	11	680	3199	..	..	660	3034	..	9	551
59	377	9	2	56	352	1	..	56	353	12	2	55	345	..	3	51
77	516	12	3	76	503	7	3	68	456	8	5	67	451	7	11	40
115	668	5	..	110	650	6	2	105	601	8	5	111	643	6	8	86
28	95	..	..	28	95	..	..	26	89	..	..	25	84	4	4	11
76	387	9	6	47	230	5	6	45	227	3	3	26	139	3	..	33
170	1116	11	3	165	1021	11	7	159	1044	7	4	161	1054	4	3	135
109	516	2	8	82	389	11	..	100	478	7	2	103	491	12	11	92
57	249	4	1	44	193	14	..	51	217	5	11	52	229	1	4	48
158	746	6	2	47	253	11	3	80	402	8	7	94	473	10	[illegible]	76
49	221	12	11	47	211	1	8	35	199	3	3	47	211	8	4	47
14	61	2	5	..	..	..	..	..	..	..	..	..	..	..	..	8
96	611	8	5	75	512	15	3	43	302	6	8	61	413	12	6	58
86	394	15	11	86	394	2	4	84	386	13	2	85	382	13	11	83
32	133	3	7	24	112	2	10	24	94	12	9	9	24	8	..	10
180	943	..	..	143	553	13	3	132	696	10	8	132	696	10	8	130
154	829	1	2	109	556	15	6	108	553	1	8	101	516	12	9	97
4270	21629	9	3	3411	17255	10	7	3198	16463	12	1	3236	16554	..	4	2959

Ayacut				Actual Cultivation and Revenue												
				1862/63				1863/64				1864/65				186
Acres	Assessment			Acres	Cost			Acres	Cost			Acres	Cost			Acres
	Rs	A	P		Rs	A	P		Rs	A	P		Rs	A	P	
166	1310	12	5	146	1032	2	4	144	1024	1	1	145	1014	7	1	146
75	1025	14	6	167	833	11	10	167	835	11	8	161	792	3	6	157
45	220	4	10	43	209	10	10	43	210	6	5	43	210	6	5	43
43	197	9	5	41	187	"	4	41	187	"	4	41	189	11	7	31
54	314	15	9	49	288	1	11	50	290	"	9	46	265	4	"	49
68	447	3	10	38	303	11	8	40	301	7	1	35	256	14	1	21
181	908	13	7	148	750	13	8	145	738	11	2	138	695	2	5	143
138	707	9	3	120	722	2	3	121	714	10	2	122	143	3	3	117
51	130	3	11	46	123	11	7	46	118	1	6	46	125	3	3	46
87	338	15	6	66	264	12	11	63	254	11	2	56	225	15	"	60
31	168	8	8	29	161	13	1	29	159	4	1	28	150	8	6	29
54	337	4	8	13	80	2	5	13	80	2	5	7	47	7	1	7
66	406	2	8	66	435	7	6	64	416	5	8	50	304	9	8	66
152	443	4	3	147	434	9	"	145	432	2	6	144	418	12	"	145
276	233	5	7	115	532	3	2	109	507	15	6	102	470	13	1	104
119	507	4	4	70	297	13	5	60	252	8	5	63	264	15	3	64
18	74	5	"	16	90	6	2	14	62	10	3	15	63	13	8	13
33	79	5	11	6	18	13	11	3	13	7	3	4	11	1	6	4
258	1702	7	8	110	698	10	7	109	690	8	10	106	667	9	3	93

Ayacut.				Actual Cultivation and Revenue												
				1862/63				1863/64				1864/65				186…
Acres	Assessment			Acres	Cost			Acres	Cost			Acres	Cost			Acres
2073	10590	4	11	1529	7967	12	5	1473	7686	12	6	1370	6742	4	7	1402
39	223	10	6	38	220	11	7	38	219	10	7	38	219	6	7	37
141	687	15	2	82	393	1	4	74	361	13	5	94	460	7	4	76
40	223	1	10	33	165	6	4	33	169	.	1	23	108	2	7	32
7	28	15	6	6	28	15	6	6	28	15	6	6	28	15	6	6
47	228	1	3	21	102	5	4	21	104	4	2	13	66	5	6	17
20	105	.	3	13	61	2	.	14	64	1	2	14	66	2	3	9
71	358	13	.	67	267	14	11	55	241	4	4	45	213	13	6	22
299	1455	12	6	262	1364	10	10	263	1352	3	7	268	1343	13	10	248
106	520	15	4	81	494	2	4	[illegible]	402	10	4	80	469	8	11	75
34	207	3	8	24	145	.	5	20	121	5	1	13	79	10	3	9
635	3248	9	5	553	2878	12	4	499	2608	14	10	365	1926	3	10	298
121	538	11	9	36	168	7	9	62	131	12	11	51	232	14	11	54
111	707	5	7	78	466	13	6	77	477	2	5	75	449	2	.	71
142	729	4	8	140	697	2	7	132	640	8	3	135	650	.	4	131
54	281	13	5	47	224	3	6	50	255	5	.	49	258	6	3	50
265	1390	.	8	219	1145	6	9	174	909	13	7	182	953	11	4	141
44	184	14	11	36	151	11	5	37	155	8	2	38	157	15	7	39
76	462	12	3	58	365	.	4	46	290	4	5	47	297	14	6	35

Ayacut.				Actual Cultivation and Revenue												
				1862/63				1863/64				1864/65				186[illegible]
Acres	Assessment			Acres	Cost			Acres	Cost			Acres	Cost			Acres
4325	22173	5	7	3313	17308	13	2	3152	16221	6	3	2906	14724	15	7	2752
49	290	"	4	37	217	2	10	33	193	6	9	32	198	10	6	29
295	1398	10	11	87	438	13	11	82	416	15	5	75	390	3	1	72
55	289	14	6	4	23	4	6	5	31	7	6	7	43	3	7	8
136	698	11	8	111	589	9	11	75	391	2	6	70	373	6	5	79
16	71	2	6	10	46	7	3	9	41	13	4	9	41	4	3	10
109	508	4	"	32	151	15	6	24	116	3	"	29	129	13	3	44
60	269	4	9	56	255	7	5	56	254	"	9	54	247	6	5	54
42	261	7	8	34	202	1	9	27	146	1	2	25	136	13	5	15
73	226	"	2	55	245	9	4	52	223	15	3	51	211	5	6	59
187	581	13	3	140	450	2	1	139	446	13	1	139	446	13	1	165
93	507	4	8	93	504	5	7	93	504	6	1	86	471	1	1	83
56	264	13	8	53	250	5	5	52	238	12	10	48	222	1	"	53
86	459	2	11	79	424	6	8	89	440	6	"	90	439	10	11	90
135	638	9	10	106	504	11	4	105	502	10	1	83	591	11	9	80
238	1284	"	7	213	1127	11	4	211	1168	7	3	198	1092	"	"	198
56	286	13	3	51	263	6	2	51	263	"	2	52	266	15	6	52
70	104	9	"	"	"	"	"	"	"	"	"	"	"	"	"	"

ment of Cultivation Under proposed Mombankum Ch

Ayacut.				Actual Cultivation and Revenue												
				1862/63				1863/64				1864/65				186
Acres	Assessment			Acres	Cost			Acres	Cost			Acres	Cost			Acres
6031	30414	1	3	4464	23,003	8	2	4355	21,600	15	5	3954	20,027	7	4	3838
95	534	.	7	87	501	11	11	89	508	10	6	76	464	7	9	68
66	354	12	11	60	329	3	2	60	329	3	2	60	329	3	2	60
174	921	7	6	126	668	14	4	125	693	10	9	131	730	12	4	142
79	438	2	1	44	247	.	5	49	268	10	4	37	216	12	6	40
127	836	15	3	80	536	8	8	92	615	1	6	95	635	6	3	99
101	641	11	.	47	310	.	6	53	350	13	9	63	406	11	5	64
99	602	3	9	80	492	6	9	82	500	10	1	80	469	.	2	79
85	564	3	4	72	463	12	2	70	457	4	2	69	476	11	2	75
109	624	11	1	90	535	10	6	94	557	14	2	98	576	.	.	98
61	364	5	2	58	341	13	8	59	362	5	2	59	362	5	2	55
76	462	4	8	63	370	10	5	65	373	5	2	67	384	.	.	62
82	417	9	10	54	277	14	7	51	266	2	7	58	294	9	10	61
149	975	10	1	91	576	5	2	89	571	3	9	86	548	11	9	113
162	734	4	7	105	432	15	4	93	428	2	10	83	378	6	.	94
7496	38,886	7	1	5521	[illegible]	7	9	5326	27,884	1	4	5016	26,300	8	10	4948
11766	60,516	.	4	8932	[illegible]	2	4	8524	44,347	13	5	8252	42,857	9	2	7907

From Captain J. C. Anderson
Executive Engineer In-
Charge of Palnd Range
To The Superintending Engr
7th Division

Dated 31
Recd } July 1869.

Appendix C

Statement of Cultivation
Under proposed Nambankum
Channel-

P.W. 4690/69.

Procs 8th Decr/69 No 123.

61

Report on the Mambaukum project_ Cheya[...] ri[...]

Description of river.

Print No 2 24/9/69

1 The Cheyuur is the drainage strea[m] of the Southern part of the Javadie hills in th[e] North Arcot District. It, at first recei[ves] its supply from the west side of the Hills, running nearly North and South, then sweepi[ng] round the Southern extremity of the Hills i[t] leaves them and runs in an easterly directio[n] to its junction with the Palar near Wallajahba[d] in the Madras District. The bed of the river in the plains is from 300 to 500 feet in width and its fall from 7 to 12 feet a mile. The bed is generally sandy but masses of rock are to be met with in places, its drainage area is about 500 Sqr. miles.

2 After leaving the hills the firs[t] considerable addition the main strea[m] receives is from the Mirugunda Nuddi which joins the river near the Village of Chedaveram; this Stream has a dam across it about a mile above its junctio[n] and most of its supply is diverted to tank[s].

Some

Some miles below this point, part of the drainage from the Curnatighur near Polur joins the river, and other smaller drainages, the principal of which is the Numbadoo Madoogoo from the South Arcot District. About 7 or 8 miles to the east of Arnee the Cheyaur is joined by the Seeaur, a river nearly as large as itself which drains a more northern part of the Javadie Hills. This river has 6 dams across it, 3 of which are in ruins.

Many Channels are led from the river, some with head Sluices, but the greater part with open heads, to supply tanks. Below these heads, when the river is low, the villagers are in the habit of running out Corumboos to turn the water into the Channels.

4 The only anicut in existence on the Cheyaur is the Cheyaur Anicut, near a village called Amurthay, about 9 miles from Arnee. One Channel only is taken off above the anicut on the south bank, called the Cheyaur main Channel. The Anicut was built in 1852 and raised 5 feet above the bed of the river, the head Sluice had 4 vents of 5 feet wide and the Channel Cheyaur Anicut

was

was 8 yards wide. In the begining of 186
the anicut was raised 2 feet, the head s
had 3 vents added to it, and the Chan
was widened to 12 yards up to Mook
tank. The following year the Channel
was improved and widened up to th
12th mile. In 1867/68 a further distan
of 11 miles of the Channel was widened
10 yards. In 1868/69 a branch Channel ca
the Tatry branch commencing in the 20
mile of the main Channel was excava
6 yards in width for 6 miles, and th
Channel is now being extended. The
main Channel is about 21 3/4 mile
in length. The Tatrey branch is 8 1/
miles long. Another branch called
Coviloor and Covalavadoo Channel
now being improved.

Cultivation under the Cheyaur Anicut.

5 The extent of land under the
main Channel is 4834 acres (includ
the last named branch). Under the Tat
Channel the existing cultivation is 20
acres and the villagers propose to exte
the wet cultivation by 1500 acres, mak
a total of 3563 acres under this branc

The

he total cultivation under the Cheyaur main Channel is therefore 8397 acres, and if the freshes continued sufficiently long, water might be supplied to other tanks.

The surplus of Boon
Tank gives a supp
to 30 Tanks, the
aggregate wet
Ayacut under wh
is 3361 acres.

6 I have experienced considerable difficulty in calculating the discharge both f the river, and the Cheyaur main Channel, wing to the very incomplete manner in hich the water registers have been kept, and to my not having had an opportunity f seeing the river in fresh. I have supplemented the information received from he registers, by careful enquiry on the spot, and the results I have obtained by calculation, I feel certain err on the safe side, hat is to say the discharges I have given re somewhat in excess of the actual ischarges.

Supply of wate
in the river

Appendix A shews the mount discharged every day over the heyaur Anicut during the years 1865 to 1868 at is since the anicut was raised, nd the diagram accompanying, hich was traced from the registers ept at Cheyaur Anicut shews the vel of the water from 1863 to 1868.

Quantity of water
passed over the
Cheyaur Anicut

The

The registers of years prior to 1863 are so incomplete that I have not attempted to trace the water level, but from the depths measured at the Head Sluice in those years it appears that water passed over the anicut (then 5 feet in height) for 7 days in 1862, the greatest height being 2 1/2 feet above the Crown, during 19 days in 1861, the greatest height being 4 feet above the crown for 1 day, not at all in 1860 and for some time in July and also in November 1859 but for how many days is not stated. I cannot discover that the under Sluices have ever been opened except on occasions when the Channel breached or work going on at the head Sluice prevented its being opened. I have marked on the diagram the occasions in which I find the under Sluices were opened, but no register having been kept while they were open, I do not know what water was passing down the river. In 1864 the Channel was breached and the head Sluice was closed, but the under Sluices appear not to have been opened. In 1865 the head Sluice was closed in order that the Channel might be cleared.

In

In 1866 the Channel breached in July and the head Sluice was closed till the begining of December, the under Sluices I am assured were not opened during that time (which would account for the great height the water rose) and in the last 3 years they have never been opened. From a record left by Mr. George, late Assistant Engineer at Arnee and from longitudinal sections of the river both at Cheyaur Anicut and near Mambaukum, I have deduced the heights due to velocity of approach at the Anicut. The full water way above the Anicut is 3 bays of 26 feet span 6 bays of 25 3/4 feet and 6 bays of 15 feet over the under Sluices. The large bays have the waterway further contracted by 2 steps of masonry on each side of each bay on the crown of the Anicut the first step is 2 feet long and 1 foot high, the second step 1 foot long and 1 foot high. The waterway therefore up to 1 foot above the crown is 286 1/2 feet between 1 and 2 feet 304 1/2 feet and above 2 feet 322 1/2 feet. The discharge was calculated for every 3 inches in height. The total quantity discharged over the Anicut is

in 1865 —	32,420,914	Cubic Yds.
" 1866 —	482,687,614	"
" 1867 —	8,492,726	"
" 1868 —	7,961,766	"

Appendix

Quantity of water discharged by the Cheyair Main Channel.

8

Appendix **B** shews the quantity of water discharged by the Cheyair Main Chan during each month of the year 1865, 1867 an There is no record to shew when the hea Sluices were closed in 1866. The discharg are, I must repeat only approximation The only register kept is the depth in fron of the head Sluice, and there is some do as to whether the depth registered is tha above the floor of the sluice or above the c The bed of the channel has no fall for 2 m from the head Sluice, and after that th fall is 2 feet a mile up to the Cadoogan Aqueduct. The bed of the first 2 miles hard gravel or rock, and the consequenc is the Channel throws back the slope s silts up the head till the bed assumes a uniform slope. After enquiry as to the dep of water on the floor of Cadooganoor Aquedu I have allowed the loss of head to vary f 2 feet to 6 inches, and with these deducti have calculated the discharges of the Chan for every 3 inches in depth. The discharge is

1865 — 59,344,012 Cubic Yards
1867 — 37,810,440 — " —
1868 — 22,622,238 — " —

and

and therefore the total discharge of the river was in

1865	91,764,926	Cubic yards
1866 Say	500,000,000	"
1867 "	46,303,170	"
1868 "	30,584,004	"

hen the head sluice was closed, I took the average discharge of other years during that month, as the amount discharged and added it to the discharge of the Channel.

From these figures I do not hesitate to say, that it is inadvisable to build any anicut above the Cheyaur. The year 1866 was an extraordinary year. No water came down the river during the early part of the year, but while the tanks all over the Country were receiving a good supply from rain, heavy floods passed down the river, 5 times as much as in the year before, 1-10 th of which water could not have been caught even if 2 anicuts had been in existance, because there was no storage room. The only other year in which floods

Objections to the proposed anicut.

of

of this kind are known to have occurred
1854 so that I leave the year 1866 out of m
calculations, for, cultivation cannot be
-tended and the capacity of tanks increa
because once in 10 years, say, a large sup
of water is available from the river.

10 The years 1867 and 1868 were unusuall
dry years, and the supply of water i
the river was so small, that no water
was supplied to tanks below Mookoo
tank (10 miles from the anicut) by the
Cheyaur Main Channel.

11 The year 1865 is allowed to have been a
good year, and the cultivation under th
Cheyaur Channel was more extensive
than in any of the last 5 years. It wa
good year not only because plenty of wa
came down the river, but because there w
an early long-continued fresh just at t
time ploughing ought to commence, and
good late fresh which left water in th
tanks to supply the crops which remain
after the monsoon rains were over.
The total discharge of the river then in
a good year is under 92 millions
of Cubic Yards, and the Cultivation
unde

under the Cheyaur main Channel and branches is 8397 acres, besides a further extent of land to which water may eventually be supplied. Should local rains fail the whole supply of the river would be required for the Cheyaur Main Channel, and for the Mambaukum Channels would remain nothing.

This however is not quite a fair conclusion, because, it almost invariably happens that when there is a good supply of water in the river, there is rain on the plains, and therefore the full amount allowed to be stored for each acre Viz[t]. 10,000 Cubic yards is not required, and also the fall of the river is so great and the freshes so sudden that it is hardly possible to catch all the water in the river even in a dry year.

Available supply for Mambaukum anicut.

The water that cannot be stopped by the Cheyaur anicut would be available for the Mambaukum project, that is to say all the water in the river would have to be passed through the under sluices of the Mambaukum anicut until the water rose to such a height as to overtop the Cheyaur anicut, when the Mambaukum Channel sluice could be opened to such an extent as would keep the water to the level of the crown of the Cheyaur

Cheyaur anicut. This could be determin
only by experiment. Referring to Appen
A it will be seen that in 1868 nearly 8
millions Cubic yards passed over the Ani
in 2 days. In 1867 nearly 8½ in 3 day
In 1865 nearly 32½ millions in 7 days
Deducting ½ million cubic yards per die
as the amount the Cheyaur main Chann
improved will carry off.
we have the Mambaukum anicut

	Cubic yds	
In 1868	7 Millions	in 2 days
" 1867	7 Millions	in 3 days
" 1865	30 Millions	in 6 days.

Mambaukum Project.

13 Accompanying this report is a
of the Survey and levels taken under Ensg
W.G. Bevan for the Mambaukum Channe
Appendix C also shews the ayacut and asse
under tanks proposed to be supplied, the
cultivation and revenue for each year from
1862/63 to 1866/67, the extent of land under
each tank assessed as Nunjah that remaine
uncultivated in the best of the 5 years, the
extent of Punjah that can be converted
into Nunjah, and the extent of waste land
that can be converted into Nunjah

The

The Project is to build an Anicut across the Cheyaur 5 miles above the point at which the river is joined by the Muroogunda Nudie, with head Sluices on either bank and to excavate channels on both sides. The northern Channel to be 28 miles long supplying 40 tanks, and the Southern Channel 27 miles long supplying 75 tanks. the northern Channel to be carried across the Miroogunda Nudie by an Acqueduct and both Channels to be carried along the highest ground practicable and generally to supply the tanks from Sluices in the Channel banks, when this cannot easily be done the Channel is carried through the tank and over the Surplus Callingulah. The width of the river at the site of proposed Anicut is 380 feet and its fall 7¼ feet per mile.

It will be seen at a glance that it is impossible to carry out the project to the extent originally proposed, cultivation will not be increased unless an increased supply of water

Can

73

can be afforded regularly and the regis[ters of]
former years afford us no grounds on [which]
to promise a larger yearly supply than [we]
had in 1865. Taking then the availa[ble]
supply in 1865, as given above, as the ave[rage]
yearly supply for the Mambankum pr[oject]
it remains to be seen whether any m[odi-]
-fication of the original scheme can be
made, which will give a reasonable re[turn]
on the expenditure necessary to carry it o[ut.]

Modification of Project. 15 First, as to the best form of Ch[annel]
I think as the soil being generally fir[m]
and hard the channel should be on[e]
carried partly within soil, and by th[is]
means the expense of cutting, which w[ould]
be considerable, as rock is frequently [met]
with a short distance below the surfa[ce]
will be lessened. The side slopes of th[e]
channel might be 1 to 1, the side slopes [of]
the embankment 1½ to 1 and the grea[test]
slope of bed I should then venture to gi[ve]
would be 2* to 1. The depth of water the
channel would be required to carry w[ould]
be 7 feet. Next, the width of the channe[l.]
It will be seen (appendix A) that the [?]
quantity of water comes down in 6 day[s]
an[d]

*2 feet to the mile

and nearly half of it in one day under the circumstances stated, 2 channels each 50 feet wide at bed would discharge 12 millions of cubic yards in 24 hours and therefore would convey very nearly all the water available.

16 Mr. Bevan has prepared plans of the anicut and masonry works for the proposed channel and detailed estimates for the principal works and an estimate of the whole cost of the project was drawn up. He proposed to make the South channel 40 feet wide and the north 24 feet. His Southern channel would nearly take off half the water.

17 To enable the channels to be of the greatest possible use I should carry them to some considerable reservoir so that if more water was ever available it can be used. The North channel should terminate in Polur tank, the South channel in Soracolathoor Chittary from whence there is a drainage to supply other tanks. The first would be 12 miles long, the second 13 miles.

I

18

75

Estimate of Cost I have carefully estimated the cutting ne-
-cessary for both channels and have al[so taken]
a rate lower than Mr. Bevan provid[ed]
but which would suffice if a large qua[ntity]
of rock is not met with. The estimate[s for]
masonry works are based on the estima[tes]
already drawn up. The following is [the]
estimate of the modified Project.

Dam and Head Sluices	30000
Northern Channel 12 miles long Earth work	135489
Aqueduct Mirugundu Nudie	10,000
5 Bridges at Rs. 1500	7500
5 Supply Sluices at 150	750
4 Masonry falls at 350	1400
Southern Channel 13 mile long Earth work	102960
1 Aqueduct	1500
4 Bridges at Rs. 1500	6000
4 Supply Sluices at 150	600
Improvement of Tanks	5000
Total of Estimate	301199

or say 3 lacs of Rupees.-

19 The returns can best be estimated in thi[s]
way. The discharge of the channels wil[l]
be

be 30 millions of Cubic Yds allowing 10000 Cubic Yds as the amount to be stored to cultivate an acre, it would provide for 3000 acres. The land revenue has not yet been settled in this District, and the assessment varies very much - It was estimated in the Tubrey branch channel that the increase of revenue on each acre watered would be Rs. 3-9-4 and from examination of the assessment given in the Statement appendix C, it would appear that this is nearly all that can be expected. I will assume it is rather more, say 3¾ Rupees per acre. The total increase of revenue on 3000 acres would then be 11,250.

20 From this a deduction must be made for the cost of establishment, which must be large, as with such sudden freshes, delay in working the shutters would cause serious loss of water. The pay of 1 Monegar and 6 Lascars would be 50 Rs. a month 600 Rupees a year. Cost of Establishment

The

The net increase of revenue would therefore be 10650 Rupees from an outlay of Rupees 3 lacs or under 3½ per cent.

Further Modification. 21 A deduction in the width of the Channels, and their extent would not make the project remunerative for the quantity of water conveyed by reduced channels decreases in a larger proportion that the cost of the works - a reduction in the length would not pay either, for want of storage room.

Project not to be recommended. 22 These are some cases in which I should recommend a project for execution, even if the expected returns were not a much larger percentage on the expenditure than here, but in this case I have not taken into account the last 2 exceptionally dry years, I have based my calculations on an allowed good year, (as may be seen from the statement, Appendix C) and I have made provision to catch almost every cubic Yard of water that passes down the river. Moreover, the modified project does not provide for an increased supply in times of scarcity but only for an extension of cultivation in good years.

23 It has been necessary for me thus fully to explain my reasons for forming a decided opinion against the advisability of carrying out the Mambau-Kum project and to look at it in the most favorable light because the project has been rather a favorite one with more than one Revenue Officer, who seeing a considerable stream of water rushing through dry and arid plains would not easily believe but that it must pay to dam the river and fill the numerous tanks which might be seen, perhaps at the same time nearly empty. The fact is the rights of the Villages under the Cheyaur Anicut to the water have not been considered; even the Tahsildars allowed that the water in the river will not suffice for the Mambakum Anicut and the Cheyaur Anicut as well, and it is proposed to enrich the one Talug at the expense of the other. Necessity for fully explaining objections

24 The Cheyaur Anicut having ... in existence for 15 years has established a right to the water it ... Claims of Cheyaur Anicut

it can consume, and as this is nea[r]
the whole of the water in the river an[d]
upper anicut scheme must be rejecte[d]
It is much to be regretted that bef[ore]
building the Cheyaur Anicut, the who[le]
river had not been examined, and it[s]
resources developed from the commence[ment]
of its Course. If an Anicut had been
built in the first instance somewhere ne[ar]
Mambaukum, one or two smaller dam[s]
might have been afterwards, constructe[d]
below it, and every drop of water in the
river, in ordinary years, utilized. As i[t is]
at present, unless the average supply of
water in the river, can be proved to be
amply sufficient for both anicuts, the
difficulty in apportioning the water woul[d]
in itself, be in my opinion a great
objection to the present project.

Reservoirs in Hills. 25 In the case of a river suc[h]
as the Cheyaur having a great fall
and bringing down occasionally a lar[ge]
body of water, generally at a time
when local rains are filling the

numerou[s]

numerous small reservoirs which are to be found all over this part of the Country, a reservoir on a very large scale formed by drawing up some gorge in the hills would be a great advantage enabling us to store the flood water for use at a time when the river was low. In accordance with my instructions I have examined the eastern face of the Javady hills with a view to find a suitable site for such a reservoir: The main Channel of the Cheyaur to the North of Chengamah, I have not yet been able to explore, as it is at some distance from the range which I have been in Charge of, and the difficulty in travelling would cause the journey to occupy more time than I could spare. Probably the Officer in charge of South Arcot District has examined the river in this part and could give some information on the subject. I can find no other site for a reservoir, on the Cheyaur, or the Southern branch of the Seraur but on examining

the

the northern branch of the Seaur about 10 miles from Vellore, I found a gorge in the hills which I think might be closed and a reservoir of same size found.

Site for reservoir 26 It will be seen from the Survey map that a little to the west of the Caniambady Pass, on the road from Vellore to Arnee, the Northern branch of the Seaur has 2 branches which join near the Village of Mathalumpuddy. Following the Southern of these branches we come to a gorge in the hills about a mile north of the Village Ammurdy. The width of the gorge is about 500 yards the width of the bed of the river about 80 yards, the ground rising from the bed of the river in steep slopes to the hills. Immediately within the gorge the bed of river widens out to about 300 yards width, the Valley is a considerable width, and the ground cut up with gullies and covered with jungle, and I believe a considerable body of water could be stored by a dam

of

of not very great height. The Catchment basin is about 54 Sqr. miles.

27 Objection to se[...]
Preferred above to dams already built across the Seeaur, the river passes for a considerable distance through the Arnee Jaghir, and the Jaghirdar has 3 dams across it, 2 of which are in good order the 3rd. breached, one of the dams is near the village of Cumakoor below the junction of the 2 branches of the Seeaur and he would consequently be the first to benefit by any reservoir that might be found in the hills.

28 Rights of Arnee Jaghirdar
Before building the proposed anicut near Tandiy I would suggest that some arrangement be made with the Jaghirdar, as it appears he has the right of building any number of dams across the Seeaur, and might affect the supply of water calculated on below.

29 Measures taken to carry out instructions.
With reference to the other instructions conveyed with your Memo under reply, I have the honor to report that I have taken levels of the bed

of

83

of the Seeaur near Arnee and 13 cross sections, a quarter of a mile apart an[d] have calculated the discharges for eve[ry] 3 inches in depth, and recorded them. I have taken measures to have the discharge gauged near Arnee and estimated.

State of the District

I have also set up gauges at the Cheyaur Anicut Channel Hea[d] Sluice and made arrangements to hav[e] the water register fully kept in future.

[M]inor improvements to Irrigation. 30

As to any improvements to the existing irrigation works that can be carri[ed] out, the principle want of the Cheyaur Ma[in] Channel is a fall in the first 2 miles of its bed, while in charge of the range I have had the head of the Channel thoroughly cleared, and it appears that the bed is for the most part rock and any cutting would be very expensive - I am about to have levels of the Polur supply Channel from the Cheyaur taken, and propose im-proving it and building a Head Sluice to it with probably a loose stone dam

across

across the river to keep the front of the sluice from silting up. The tank is a fine one, existing ayacut is 946 acres and in the best of the last 7 years 94 acres of this were uncultivated. An estimate for raising the dam across the Mirosgunda Nudie, has already been submitted.

31 In conclusion I wish to remark that the state of this portion of the North Arcot District does not seem to me so bad as it made out to be. The Polur Tahsildar says he recommends the Talug should be given up and left as jungle. The records of past years show that wet cultivation is carried out to a considerable extent, and it is a fact that fresh land for dry cultivation is constantly being taken up. The last 2 years have been unusually dry, and cultivation is very scanty in consequence. Wet cultivation from wells is going on in places, and from measurements I have taken, I find that water is nearly every where to be found from 15 to 20 feet below the surface of the ground. I

State of the District

85

I do not believe the rain fall is [cut off]
now than formerly, but I think it very pro-
-bably that the great clearance of jungle [cut off]
the hills, has made the country drier, an[d]
in this respect it will continue to get w[cut off]
The Padavadoo jungles afford a means [of]
livelihood to hundred of people, who app[ear]
to me to cut indiscriminately, mutilati[ng]
the trees, and wasting the wood, acres an[d]
acres of charred stumps may be seen, th[e]
ground between being ploughed up and
sown and columns of smoke rising
beyond show that the work of destruct[ion]
is still going on.

The Villages thereabouts becom[e]
healthier, in all probability but the coun[try]
becomes drier, and as the clearance exten[ds]
the dryness will increase.

Arnee }
31st July 1869 }

(Signed) J. O. Hasted Captn
Exe: Engineer Polur Ra[nge]

(True Copy)

[signature] Lt Col R.E.
A. J. Sup. J. Eng. Sth D[iv]

87

No. 3096. Supg Engrs Office 4 Dn
Madras 14 September 1869

From,

Lieut Colonel J. Bean R.E.
Acting Supg Engineer 4 Division

To,

Major J. Mullins R.E.
Acting Chief Engineer for Irrigation

Cmmt No 1
21/9/69

Enclosures 8

Sir,

No. 2643 dated 1 August 1869 Paragraph 8.

With reference to G.O. as per margin and to your Memoranda Nos. 16[illegible] and 184 dated 1 April and 23rd April 1869, I have the honor to submit a report from Captain Hasted R.E. Executive Engineer in charge of the Polur Range North Arcot District on the project which has lately been investigated of throwing an Anicut across the upper branch of the Cheyaur River near Mambakum, for the irrigation of lands in the Polur Talug of the North Arcot District, and on the supply of water now available in the Cheyaur River for the irrigation from the Tanks dependent on

the

the existing Anicut across this River near Arnee at the village of Amirithy.

2 This report is accompanied by a Survey of the Country proposed to be irrigated, shewing the site of the Anicut, the alignment of the Channels on both banks, and the situation of the Tanks to be fed, also by a line of sections of the channels, all the plans and surveys having been prepared by a Surveyor under Mr. Assistant Engineer Bevans orders. An ayacut statement shewing the present cultivation and expected increase from the project, and two registers giving the quantity of water passing over the Cheyaur Anicut and through the Head Sluice for a eries of years are also enclosed.

The investigation of the amount of water obtainable from the Cheyaur Anicut Channels is intimately associated with that of the project now under review, because unless the Tanks supplied from

this

this Anicut – receive their full supply of water for irrigation and sufficient water is stored in them and also taken off direct from the Channel for the increased cultivation which it is hoped will be obtained on the extension of the project, it is unprofitable to make enquiries regarding the further storage of water from the river for other projects. It becomes necessary therefore to ascertain what amount of water the Cheyair Anicut now diverts and what quantity of cubic yards are running to waste when freshes pass over this work.

4 As regards the question of the sufficiency of the Cheyair Anicut supply Captain Hasted reports that he has had considerable difficulty in obtaining a correct register of the water passing down the river and channels daily monthly and yearly. These registers have been imperfectly recorded, and the guages put up to ascertain the depths have not been properly fixed. He encloses a diagram

shewing

shewing the heights of water at the Anicut from 1863 to 1868, and he gives approximately the total discharge in Cubic yards over the work from 1865 to 1868, the crest having been raised from 5 to 7 feet in the former year - He also furnishes the discharge approximately through the Head Sluice for the same years, the quantity in 1866 being assumed not having been properly registered -

5 The year 1866 was an exceptional year and the floods were from five to fifteen times greater in volume than in ordinary years - Such a similar flood had not occurred since 1854, and it is safer to leave such years out of our calculations -

6 In estimating the quantity of water passing through the sluice no register of the depth below the vents has been kept - The fall of the Channel is inappreciable for two miles, and Captain Hasted was obliged to assume

a

a certain figure for loss of head at the work

7 It is shewn from the registers kept that the freshes passed over the Anicut in July and November of 1859 but for what number of days is not known, none at all in 1860, nineteen days in 1861 when the Anicut was 5 feet high, seven days in 1862 with the same height of Anicut, seven days or one day in 1863 according to which height of Anicut is taken, twenty five days or three days in 1864, seven days in 1865 the year in which the Anicut was raised, three days in 1867 and two days in 1868. In the three years under review the quantity of water passing down the river and channels is given below -

Year	Anicut	Channel	Total Cubic yards.
1865	32.420.914	59.344.012	91.764.926
1867	8.492.726	37.810.440	46.303.170
1868	7.961.766	22.622.238	31.584.004

8 The years 1867 and 1868 were unfavorable, the monsoons having failed, but Captain Hasted states the year 1865 may be taken as an average one the

the extent of the freshes fully representing what ordinarily may be calculated upon for irrigation purposes. It will be seen that the sluice passed down 59 millions of yards and the anicut was submerged for seven days, 32½ millions of yards nearly having passed over it.

9 I have studied the diagram of water at the Anicut carefully in order to make still further a comparison of the year 1865 with others, and though the actual discharge in 1863 and 1864 has not been computed I have obtained an approximate estimate of the quantity of water passing down by taking the heights of the water at the anicut each day in the year. I find that in 1863 there was water for 89 days or 3 months in the river to a total depth on the Anicut of 233 feet, in 1864 for 143 days or five months to a depth of 344 feet, and in 1865 for 122 days or four months to a depth of 228 feet. The quantity of water

water therefore in 1863 and 1865 correspon[ds]
whilst in 1864 it was probably half as
much more as in these years - The freshe[s]
however in 1865 were rather more
seasonable for cultivation than in 1863
and 1864 -

10 The amount of cultivation unde[r]
the main Channel is 4834 acres, the Tetry
branch which we are now excavating supplie[s]
2063 acres, and 1500 acres more are expected
to be brought under cultivation when the
extension is completed, making a total of
8397 acres - Captain Hasted reports th[at]
the surplus of Poorsay Tank near the end
of the main channel gives a supply to 3[..]
tanks the aggregate ayacut of which
is 3361 acres, but this irrigation is most
uncertain the land being now dependent
on the rain fall - The Executive Engineer
assumes the quantity of water required
for one acre as 10,000 Cubic yards, I will
take it as 7000 in order to place the project in
the most favorable light - The 8397 acres
will require therefore 58 millions of cubic
yards of water about equivalent to the
quantity

quantity passed through the Sluice in 1865, whilst if the additional acreage referred to above is taken into consideration 8/9 ths of the supply passing down the Cheyaur River that year would be required -

11 Assuming that 30 millions of yards, which is the amount in excess passing over the Anicut, are available for cultivation from an upper Anicut project, this quantity will irrigate an extent of 4000 acres, and taking the revenue as 3 3/4 Rs per acre on the average, as given in Captain Hasted's report, the return would be Rs 15000 exclusive of deduction for maintenance and establishment - The estimate framed by Mr Bevan amounted to Rs 4,54000 which was prepared for the system of channels as shewn in the accompanying Survey, so that the profit would amount to 3 per cent -

12 It is true that the extent of rain fall ought to be taken into consideration, and that in a good year the tanks which might otherwise be supplied from the

river

river freshes are half or three quarters filled by the local rains, but the return here given show the actual quantity of water passing through the sluices as nea as we are able to approximate to it -

13 The ayacut statements as prepa by the Collectors of North and South Arco and which are tabulated in the enclosed stat with the exception of the Tinderanum Talu which I have included at the foot shew that the quantity of land capable of irrigat were the Tanks provided with a full supp is in excess of the above and amounts to 33 Acres of Nunjah, 2306 acres of Poonjah, an 2128 acres of waste land convertible in Nunjah -

14 The profits likely to be derived f the original project having been shewn to unremunerative, Captain Hasted has roughly estimated the cost of building th Anicut and excavating the Channels on a reduced scale extending them only so far to enable them to supply two of the large reservoi

reservoirs on each bank of the river. He then estimates the returns likely to accrue and the per centage of profit on the outlay. The original work contemplated channels 28 and 27 miles long North and South feeding 40 and 75 tanks on each bank of the river, the Executive Engineer reduces the lengths to 12 and 13 miles terminating in the Poluz and Soracolatoor Tanks. He also adopts a capacity of channel 50 feet wide at sole, side slopes 1½ to 1, fall of bed 2 feet per mile, capable of carrying off the two together, as also found by calculation, 12 millions of cubic yards in 24 hours, the quantity which was brought down in one day in 1865 amounting to nearly one half the whole supply of that year over the anicut.* The cost of such a modified project he estimates at 3 lacs, and the return from 3000 acres of wet cultivation, at 3¾ Rs per acre, deducting 600 Rs per annum for establishment, at Rs 10,650, barely 3½ per cent on the cost. Taking the data I have assumed for the irrigation of an acre of

*Cubic yards 32,420,914

of land, the area would amount to 4000 acres yielding under 5 per cent as a return for the expenditure - I must further observe however that I do not see from the Ayacut Statement that the lesser extent of land, even, mentioned above, is available for increased cultivation from this supply - The original project without any modification contemplates the irrigation of about 7700 acres only, Nunjah poonjah and waste land all included -

15 Captain Hasted refers to the subject of forming capacious reservoirs in the hills to be fed from the sources of the Secaur and Cheyaur Rivers, which was one of the matters for investigation brought to his notice when he was appointed to the duty of investigating this project - His occupations as Range Officer have precluded his carrying on this investigation excepting to a very partial extent, but he believes that a gorge of the hills west of Vellore through which one of the principal tributaries of the Cheyaur flows and which he has

hastely

hastily explored offered a favorable site for such a reservoir -

16. Though I have shewn in paragraph 11 that the available water is not sufficient to cultivate a sufficient extent of land to make the project barely renumerative on the basis of Mr. Bevan's estimate, I will assume that the whole land could have been irrigated as entered in the Collector's statements of ayacut, and then see what the gain on the capital laid out would be.

17. Mr. Reade the Collector of South Arcot reports that the increased return to Government, if the Anicut were built, would be Rs 13,690 in his District - Taking the total amount of land to be cultivated under every head to be 7763 acres, of which 5088 are in the North Arcot District, and allowing Captain Hasted's data for the increased average revenue on each acre the return

would

would be Rs19,080. Thus the whole increased revenue would be Rs 32,770 on an outlay, which the Executive Engineer considers under estimated, of Rs 4,54,000, or 7.2 per cent.

18 From these remarks on the project it will be seen that the scheme of irrigation from an upper anicut on the Cheyaur does not present itself very favorably to view. The existing Cheyaur Anicut irrigation is now being extended, and it is known that if the Tanks which are fed from these Channels receive their full supply, which the local rains have scarcely ever as yet been able to afford, there is quite sufficient land to take up all the water which can be drawn off by the head sluice. If another work were constructed higher up the river there is every probability of the water being diverted from the present anicut and the cultivators under it unjustly deprived of their fair supply. In such a rapid river

also

also where the floods are of short duration, it would be very difficult to establish such regulations for the working of the sluices as would allow of the surplus water, only passing over the lower anicut, being made available for the upper one -

19 I think it is to be regretted that the registers of the floods in these rivers are so imperfect as to prevent our obtaining more reliable returns, or, at any rate, returns embracing a longer series of years - Though the river was flowing for a greater number of days in 1864 than in 1865, the floods which passed over the anicut only lasted 3 days - In 1863 the anicut was only over topped for one day, and I think sufficient has been deduced to shew that the floods are of short duration, and the great fall of the bed insures their rapidity - In 1867 and 1868 which were however very dry years, and when the rains only affected the river

in

in June and August failing altogether in the Monsoon months, the whole of the floods to the extent of eight millions passed over the Anicut in 2 and 3 days, and in 1865 nearly one half the whole quantity discharged in the 7 days when the Anicut was submerged, namely 13 millions flowed down in one day - Such being the character of this river, I think our attention ought to be drawn to the capabilities of the country drained by its agency for forming storage reservoirs as the cost of capacious channels capable of taking off these flood waters and which would necessarily be of great length to feed numerous small tanks as this project embraces, would be quite incommensurate with the amount of profit derivable from extended irrigation -

20 I am not aware what circumstances led to the adoption of the site for the present Anicut, but I believe if the work had been built below the confluence

confluence of the Cheyaur and Seeaur rivers it would have commanded an equal number of large tanks, whilst the water of both branches would have been made available - You have been informed, however, that a project for cultivating lands both in the North Arcot and Madras Districts from an Anicut across the main river near Tandry, about ten miles below the existing work, has been in course of investigation for the last year - A large number of tanks have been contoured, a series of levels, embracing very many miles in length and extending to the junction of the Palar and Cheyaur rivers, have been made, and the Survey has been completed and partly plotted - As this project will embrace the storage of water from a larger extent of drainage, and the utilization of the flood waters of the Kalwai Mudagoo a stream flowing into the Cheyaur which is fed indirectly

from

from the Palar river, as well as the supply of two or three very large and fin Tanks such as the Doosy Mamandoor an Ootramalloor, I believe it will be foun more worthy of our attention than a scheme to divert the surplus water of the Seeaur river alone - In a few mont Mr. Leggatt the Executive Engineer a Chinglepat will have had the plans dra out, and an estimate made which will enable us to form a judgement to the remunerative character of the project, though the registers of the northe branch of the river or the Seeaur hav yet to be recorded -

I have the honor to b
Sir
Your most obedient servan

[signature] Lieut Col
Ag Supg Engr [illegible]

P. W. 1869 Dept
Pro: of Govt for Dec.
No 568.

No 4690.

From,
The Actg Supg Engineer
4th Division

To,
The Chief Engineer
for Irrigation

4 E. Recd.

Dated 14th September 1869
Recd
Rd 8th Novr No 3096

* Three plans have been sent to the S. Engr &c &c by Mr. Hawkins

Encl: 8 *

Submitting with remarks a report from Captn Hasted R.E. Executive Engineer Polur Range North Arcot District on the project which has been lately investigated of throwing an Anicut across the upper branch of the Cheyaur river near Mambaukkum for the irrigation of lands in the Polur talug North Arcot District.

No 123
3 Novr 1869 R. Lindsay

No 3854 - 8: Decr 1869.

Irrigation

Public Works Department

No. 3854 3854 107

Proceedings of the Madras Government

Under date the 8th Decr. /69.

Read the following

From The Ag. Supg. Engr.
4th Dn.
} H.E. No. 3096 of 14th Septr./69 |

Amongst the many irrigational projects which have been pressed upon the attention of Government by various Revenue Officers, perhaps not one has, at different times and by different persons been more strongly urged on account of its supposed useful and remunerative character, in comparison with its size, than the scheme for the construction of an anicut across the Cheyaur near Mamandoor in the

North

Public Works Department
No. 3 8 [illegible]

North Arcot District which
is reported on in these papers.
The work was represented
as being calculated not
only to improve and extend
cultivation in the Polur
and Wandiwash talugs
of that District and in a
part of South Arcot, but
as being essential for the
protection of a wide tract
of country from the effects
of the failure of the rains
and ~~from the resulting dis-~~
~~tress (and was in fact stated~~
~~to be indispensable.")~~

~~Although ancient~~
~~although an ancient a crop~~
~~the same river at a~~
~~village named "Arnutchy"~~
near

I would omit the last and
say
"for the distress which
must result from such a
contingency."

See para 6 of Memorandum by
Mr. Robinson recorded in Rev. Pro.
dated 3d Feby 1868, No. 308.
See also Despatch from Secy: of State
recorded in Rev: Pro: No. 1244 of 6th May 1868

I would rather say
although the existence of
an ancient across the same
river at a village named

anicut by some twenty miles below Mamandoor rendered it problematical whether there would be water to spare

~~near Arnee, some twenty~~ ~~[mi]les below Mamandoor was, abo~~ ~~exploded, and that it was~~ ~~thus doubtful whether the~~ ~~was any water to spare~~ for diversion by another work of the same description higher up, the Govt. took the earliest opportunity of means for investigating the project being at their dispo[sal] to cause the scheme to be thoro[ugh]ly examined. The result is now submitted by the acti[ng] Chief Engineer, and after the most careful consideration the Govt. are of opinion that it has been clearly established that, in all ordinary seasons the discharge of the Cheyaur is not more than is sufficien[t]

to

to supply water for distri-
bution from the present
Anicut at Amurthay
and from other old standing
channels. These draw off,
and already utilize in
average years, a large pro-
portion of the more or less
precarious supply which
the river can give to tanks
on either side, and though,
in exceptionally good years
they may not be able to
do this, but allow a con-
siderable volume of water
to escape, the Govt. are
not satisfied that it will
be expedient to undertake
the construction of a system

of

of expensive works on ~~such a~~ the contingency ~~as~~ that they ~~will~~ may now and then be useful. They have little confidence ~~in the expectation~~ that the desired improvement of irrigation in North Arcot will be effected by the construction of an anicut at Mambaukum but they hope that the result of the further enquiries that are being prosecuted to ascertain how far it might be advantageous to erect a second anicut below the junction with the Cheyaur of its large northern branch, the Seear, will be more favorable.

The Acting Chief Engr. reports that arrangements

have

the

may

(omit)

have been made for the pro-
per record of the extent and
duration of the freshes, and
for ascertaining how much
of the Cheyaur water is utilize
by the Amurthay anicut
main channel, and how
much passes over the anicut.
He proposes also that the
circumstances and require-
ments of the irrigation under
the Amurthay anicut, which
he points out are peculiar,
should be carefully and
systematically examined
into, in order that the works
may be placed on as satis-
factory a footing as may
be found practicable, and
that the best data may be
obtained for proving what
quantity

quantity of river water, in addition to the supplies obtained by the banks from local rainfall, is really required. Major Mullins thinks that, at the end of 4 or 5 years, it will be possible to form a reliable opinion as to the value of the Cheyair as a source of irrigation, and as to the amount of surplus water available for irrigation from an anicut lower down than Anantharay, after providing for existing rights and claims.

The Government approve of these proposals, and the Supt. Engineer of the 4 Division will be instructed to make the necessary arrangements for carrying out the

the

the Chief Engineer's
suggestions. Attention will
at the same time be given
to the Sear, to the investiga-
tions required to ascertain
whether any of the flood waters
of this river, or of the Cheyaur,
can be stored in the Hills
in which these streams take
their rise, to the improvement
of the supply channel of the
Sehir bank, and of any other
old channels which may be
found capable of being ren-
dered more efficient.

Col: Bean should also
take measures for ascertain-
ing, in communication
with the Collector of North Arcot,
what the rights of the Arnee
Jaghirdar, in respect of

the

115

the water supply of the
Seear, may be; and, in o
that the Govt. may be m
better able to judge of th
extent to which Cheyar
freshes, both above and
below the junction of th
Seear, are utilized, the Sup
Engineer is requested to o
tain full information r
garding all the channels
on both banks of the riv
with particulars of the cu
tivation under the tanks
Connected with them for
series of years.

50

[signature]

To Supg Engr. 4th Dn.
" Chief Engr. for Irrign.
" Rev. Dept.

Despd 10/12/69.

the whole supply of the
Ocean may be; and in order
that the Govt. may be the
better able to judge of the
extent to which [illegible]
reaches, in the above and
below the junction of the
Ocean are entrusted, the Engi-
neer is requested to fur-
nish full information re-
garding all the Channels
on both banks of the river
with particulars of its ad-
ministration under the Govt.
connected with them for a
series of years.

[illegible]

Circulate

The Government are of opinion, from a perusal of these papers that it would not be prudent to ta[ke] any steps at present fo[r] the construction of an uppe[r] anicut on the Cheyau[r] with a view to the better supply of the Polur Talu[k]. It appears to be uncertain whether, in an average yea[r]

the water supply of the river is more than sufficient for the cultivation under the existing Anicut, and for the other channels, which at present afford a more or less precarious supply to tanks on either side of the river.)

The Acting Chief Engineer reports that arrangements have been made for the proper record of the extent and duration of the freshes, and for ascertaining how much water is utilized by the Anicut main channel, and how much passes over the Anicut. He proposes also

also that the circumstances
and requirements of the
irrigation under this Ama
which he points out are
peculiar, should be care
-fully and systematically
examined into, in order that
the works may be placed
on, as satisfactory a footing
as may be found practical
and that the best data
may be obtained for
judging what quantity of
river water, in addition
the supplies obtained by
the Tanks from local
rainfall, is really required
Major Mullins thinks that
at the end of 4 or 5 years

it will be possible to
form a reliable opinion
as to the value of the
Cheyaur as a source
of irrigation, and as to the
amount of surplus
water available after
providing for existing
rights and claims.
The Government ap-
prove of these proposals, and
the Superintending Engineer
of the 4th Division will
be instructed to make the
necessary arrangements for
carrying out the Chief
Engineer's suggestions. Atten
will at the same time
given to the Secary to the
investigations

investigations required to as-
certain whether any of the
flood waters of this river
of the Cheyaur can be
stored in the Hills in
which these streams take
their rise, to the improve-
ment of the supply Cha[nnel]
of the Polur Tank, an[d]
of any other old Channel
which may be found c[a]-
pable of being rendered
more effecient.—

4. Colonel Beansh[aw]
also take measures fo[r]
ascertaining, in commu-
nication with the Coll[ector]
of North Arcot, what
the rights of the Arue[e]
Jagherda[r]

Jaghirdar, in respect of the water supply of the Secar, may be; and, in order that the Government may be the better able to judge of the extent to which Cheyaur freshes, both above and below the junction of the Secar, are utilized, the Superintending Engineer is requested to obtain full information regarding all the Channels on both banks of the river, with particulars of the Cultivation under the Tanks connected with them for a series of years.

To the Supd. Engr. 4th D.
" " Chief Engr. for Irrig.
" " Revenue Dept.

Cir. 4690

Govt. of (1869) Madras.

PUBLIC WORKS.

To The Superintending Engr.
4th. Division

Dated

Recd. Encl. 5

G. O. 8 Decr. 1869, No. 3856

Nos. 123-124

Anicut. Passing orders on the letter from the Supg. Engr. of the 4th Dn. relative to the project for the construction of an anicut across the Cheyaur near Mamandoor in the North Arcot Dt.